PB81-190050

Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities Under RCRA (Resource Conservation and Recovery Act), Subtitle C, Section 3004

(U.S.) Environmental Protection Agency
Washington, DC

Dec 80

U.S. Department of Commerce
National Technical Information Service
NTIS

PB81-190050

BACKGROUND DOCUMENT

STANDARDS APPLICABLE TO OWNERS AND OPERATORS
OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL
FACILITIES UNDER RCRA, SUBTITLE C, SECTION 3004

General and Interim Status Standards for Tanks
(40 CFR 264 and 265, Subpart J);
Interim Status Standards for Chemical, Physical,
and Biological Treatment
(40 CFR 265, Subpart Q)

This document (ms. 1941.13) provides background information
and support for EPA's hazardous waste regulations

PRODUCT OF:
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

U.S. ENVIRONMENTAL PROTECTION AGENCY
April 1980
Revised edition, December 1980

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	3. Recipient's Accession No. PB81 190050

4. Title and Subtitle Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities Under RCRA, Subtitle C, Section 3004 General and Interim Status Standards for Tanks; Interim Status Standards for Chemical, Physical, and

7. Author(s) Biological Treatment

5. Report Date Rev. Ed. Ded. 1980

6.

8. Performing Organization Rept. No. 1941.13

9. Performing Organization Name and Address

U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Office of Solid Waste

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address

Same.

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This document is one of a series providing support for regulations issued by the U.S. Environmental Protection Agency (EPA) under Subtitle C of the Resource Conservation and Recovery Act (RCRA). The regulations represent the initial effort for nationwide control of hazardous waste from point of generation, through transportation, treatment, and storage, to point of ultimate disposal.

This document covers standards applicable to hazardous waste management facilities, specifically, the management of hazardous waste in tanks, (Subpart J) and in chemical, physical, and biological treatment facilities other than surface impoundments and land treatment facilities (Subpart Q).

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms
Resource Conservation Recovery Act regulations
Hazardous waste facility standards

c. COSATI Field/Group

18. Availability Statement:	19. Security Class (This Report)	21. No. of Pages
	20. Security Class (This Page)	22. Price

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

CONTENTS

1. FOREWORD 1

2. INTRODUCTION AND RATIONALE FOR THE REGULATION . . . 7

   I. RCRA Authority for the Regulation. 7

   II. Key Definitions. 8

   III. Damage Cases 10

   IV. State Legislation. 18

3. ANALYSIS OF THE INTERIM STATUS STANDARDS, ORGANIZED BY SUBJECT. 22

   I. The definitions of "basin" and "storage tank". 22

   II. The definitions of "treatment" and "treatment facility". 27

   III. Compatibility of the Waste with the Containment Device and/or its Liner. 33

   IV. Continuous Feed Operations 39

   V. Freeboard. 43

   VI. Waste Analyses and Trial Treatment Tests 46

   VII. Inspections. 53

   VIII. Closure. 60

   IX. Special Requirements for Ignitable and Reactive Waste 66

   X. Special Requirements for Incompatible Waste. . . 75

   XI. NPDES Facilities 79

   XII. Miscellaneous Comments 82

4. ANALYSIS OF GENERAL STANDARDS FOR TANKS. 84

   I. Applicability. 86

   II. Design of Tanks. 88

III. Compatibility of Waste with Containment Device . . 95

IV. Freeboard and Overfilling Controls 97

V. Waste Analysis and Trial Tests 100

VI. Inspections. 102

VII. Closure. 108

VIII. Ignitable, Reactive and Incompatible Wastes. . . . 109

5. REGULATION LANGUAGE 112

I. Interim Status Standards for Tanks 113

II. Interim Status Standards for Chemical, Physical and Biological Treatment. 118

III. General Standards for Tanks. 122

6. PROPOSAL: Additional Interim Status Inspection Requirement 128

7. PROPOSAL: Air Emission Requirements for Tanks. . . 132

References

Appendix: NFPA Buffer Zone Requirements

1. FOREWORD

Organization

This is one of a series of documents providing support and background information for regulations issued under Section 3004 of the Resource Conservation and Recovery Act (RCRA). This background document concerns the management of hazardous waste in tanks and in chemical, physical, and biological treatment facilities (40 CFR Parts 264 and 265, Subparts J and Q). It is divided into three parts. The first part (Chapter 2) contains introductory material which addresses the Congressional authority for the regulation, key definitions used in the regulation, examples of damage incidents which illustrate the need for the regulation, and a description of precedents set for the regulation by State and/or other Federal statutes. The second part of this document (Chapters 3-5) describes the regulations as originally proposed, summarizes and responds to comments received that relate to the proposed regulation, and indicate the Agency's rationale for the final regulation. The third part (Chapters 6 and 7) presents two new proposals.

Chapter 3 contains a discussion of the requirements for storage in tanks proposed on December 18, 1978 and the comments on these requirements. Also contained in Chapter 3 is the rationale for the Interim Status Standards for Tanks and for Chemical, Physical and Biological Treatment Facilities which were promulgated on May 19, 1980.

One of the requirements for tanks (§265.198) was promulgated in May 1980 on an interim final basis. This means that although the regulation becomes effective in due course (November 1980), the Agency accepted comment for a specified period. Comment was also requested as to the propriety of including several other requirements as Interim Status Standards. The Agency's response to the comments received is contained in Chapter 4.

Chapter 4 also contains the rationale for the general (permit) standards for tanks. These standards are being promulgted interim final and 90 days is allowed for comment.

No General Standards for Chemical, Physical and Biological Treatment Facilities have been developed at this time. These standards are expected to be promulgated in early 1981.

Chapter 5 contains the current regulation language for (1) Interim Status Standards for Tanks, (2) Interim Status Standards for Chemical, Physical, and Biological Treatment, and (3) General Standards for Tanks.

Chapter 6 discusses a proposal to include a new requirement for comprehensive inspections of tanks in the interim status requirements for inspection of tanks.

Chapter 7 discusses a proposal to include a requirement for control of air emissions in the general standards for tank (Part 264, Subpart J).

Interim Status

On December 18, 1978, in §§250.44 and 250.44-1 of the proposed RCRA Section 3004 regulations, the Agency proposed standards for the storage of hazardous waste in tanks. In §§250.45-4 and 250.45-6, the Agency proposed standards for the treatment of hazardous waste in basins. (The proposed §250.45-6 standards applied also to treatment facilities other than basins.) As specified in §250.40(c)(2) of the proposed rules, certain of the proposed §§250.45-4, and 250.45-6 standards applied to facilities during the interim status period (i.e., the time from the effective date of the interim status regulations until the Agency's final decision on a facility owner's or operator's permit application).

Several commenters asked that the set of standards applicable to facilities with interim status be expanded, pointing out that the Agency has predicted (43 Federal Register 58984) that the ultimate permitting process may take several years to complete. In response to these comments, the Agency has added several of the proposed permanent status (or general) standards to the set of final interim status standards. As explained in the preamble discussion entitled "Interim Status Standards", in general, the Agency included permanent status (general) standards in the set of final interim status standards if the standard:

(a) can be implemented by the regulated community within the six-month period between the time the regulations are promulgated and their effective date;

(b) does not require large capital expenditures for items which would later require approval as part of the permitting process; and

(c) can be implemented directly by the regulated community without the need for consultation with or interpretation by the Agency.

The Agency believes that some of the proposed permanent status technical requirements for the design and construction of tanks, basins, and chemical, physical, and biological treatment facilities -- e.g., EPA review of tank design and specification of minium shell thickness -- storage capacity -- should not be implemented during the interim status period. The costs of upgrading these aspects of facilities will be considerable and the designs will require Agency approval, which is properly part of the permit issuance process. Therefore, these requirements are not included in the final interim status standards.

Some of the proposed §250.45-4 and 250.45-6 standards for basins and other types of treatment facilities contained "Notes", which provided alternative standards to those in the text of the regulation, available upon making a specified showing to the Agency. To avoid the burden to the Agency of having to pass on such requests during the interim status period, the final interim status standards have been rewritten so that, although alternative standards may be available only under specified conditions, no showing or Agency approval is necessary.

In the proposed rules, the standards for tanks were somewhat different than those for basins. Tanks were regulated as covered containment devices used for storing hazardous waste, while basins were regulated as uncovered containment devices used for treating hazardous waste. (The proposed rules did not address the use of tanks for treating hazardous waste.) Both tanks and basins, however, were defined to be constructed out of man-made materials.

The comments revealed that this distinction between covered storage devices and uncovered treatment devices did not reflect actual practice very well. The final rules call all non-portable containment devices made of non-earthen materials tanks, whether they are covered or uncovered, or used for storage or treatment. All tanks are covered by a single set of regulations (40 CFR Part 265, Subpart J). The Subpart J standards include standards from the proposed §§250.4-1 (Storage Tanks) and basins in the proposed §§250.44 (General Storage) and 250.45-6 (Chemical, Physical, and Biological Treatment Facilities).

Subpart Q contains requirements which pertain to chemical, physical, and biological treatment conducted in facilities other than tanks, surface impoundments (Subpart K), or land treatment facilities (Subpart M). For example, facilities which treat hazardous waste using distillation columns, centrifuges, or filter presses must comply with the Subpart Q standards if they do not meet the definition of "tank" specified in the final Part 260 rules.

The Phase I Subpart Q standards are essentially identical to the Phase I standards for tanks. Therefore, the standards in these two Subparts are discussed together in Chapter 3. References to tanks in Chapter 3 are also meant to include the waste containment components of chemical, physical, and biological treatment equipment.

2. INTRODUCTION AND RATIONALE FOR THE REGULATION

I. RCRA Authority for the Regulation:

In Section 3004 of Subtitle C of the Solid Waste Disposl Act, as substantially amended by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended (42 U.S.C. §§6901 *et seq*.) the Congress of the United States requires the Administrator of the U.S. Environmental Protection Agency (EPA) to promulgate regulations to establish such standards, for hazardous waste treatment, storage, and disposal facilities as may be necessary to protect human health and the environment.

Sections 3004(3) and (4) of the RCRA state that the standards to be promulgated by the EPA must include requirements for -

> "(3) *treatment*, *storage*, or disposal of all such waste received by the facility pursuant to such operating methods, techniques, and practices as may be satisfactory to the Administrator:
>
> "(4) the location, design, and construction of such hazardous waste *treatment*, disposal, or *storage* facilities; [emphasis added].

To comply with this mandate, the Agency must, among other things, promulgate regulations that will protect human health and the environment from the potential adverse effects of (1) treating or storing hazardous wste in tanks and (2) treating hazardous waste in facilities subject to regulation under Subpart Q.

II. Key Definitions

The following terms, which are defined in Part 260, are key to this area of regulation:

- "Freeboard" means the vertical distance between the top of a tank or surface impoundment dike, and the surfae of the waste contained therein.

- "Incompatible Waste" means a hazardous waste which is unsuitable for:

(i) Placement in a particular device or facility because it may cause corrosion or decay of containment materials (e.g., container inner liners or tank walls), or

(ii) Commingling with another waste or material under uncontrolled conditions because the commingling might produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases.

(See Part 265, Appendix V, of this Chapter for examples.)

These definitions are further discussed in the background document supporting the final Part 260 rules.

- "Inner liner" means a continuous layer of material placed inside a tank or container which protects the construction materials of the tank or container from the contained waste or the reagents used to treat the waste.

This definition was added to the final rules to distinguish between continuous layers of materials used to line facilities constructed primarily of non-earthen materials (e.g., tanks) and those constructed of earthen materials (e.g., landfills). The former type of facility is always lined with man-made materials, the latter is often lined by earthen materials. Because the precautions needed to protect these linings depend on the materials used to make them, it is appropriate to have different terms to refer to them in the regulations. Accordingly, continuous layers of material used to line facilities constructed primarily of non-earthen materials are called "inner liners", and materials used to line facilities constructed of earthen materials are called "liners".

- "Storage" means the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

This new definition expands and clarifies the definition of "storage" in RCRA. It makes clear that the underlying difference between storage and disposal is one of intent to remove the waste after a limited time, rather than any difference in facilities and equipment. The need for this new definition is discussed in the background document entitled "Containers and Piles".

- "Surface Impoundment" or "impoundment" means a facility or part of a facility which is a natural topographic depression, man-made excavation, or dike area formed primarily of earthen materials (although it may be lined by man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

The analysis of comments received on the proposed definition of "Surface Impoundment" and the rationale for the modifications made to the definition in the final rules is contained in the background document entitled "Surface Impoundments".

- "Tank" means a stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

The analysis of comments received on the proposed definition of "Storage Tank" and the rationale for the modifications made to the definition in the final rules is contained on page 22 of this document.

- "Treatment" means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.

The analysis of comments received on the proposed definition and the rationale for modificaitions made to it in the final rules is contained on page 27 of this document.

- "Totally enclosed treatment facility" means a facility for the treatment of hazardous waste which is directly connected to an industrial production process and which is constructed and operated in a manner which prevents the release of hazardous wste or any constituent thee of into the environment during treatment. An example is a pipe in which waste acid is neutralized.

The rationale for adding this definition to the final rules is contained on page 30 of this document.

III. Damage Cases

The following damage cases illustrate the potential hazards associated with the improper storage or treatment of hazardous waste. They demonstrate the need to regulate any type of containment device that is used to treat or store hazardous waste -- to guard against the damage that these kind of operations can entail. The influence which these damage incidents had in establishing the final standards for tanks and chemical, physical, and biological treatment facilities is explained in the sections of the document where the individual standards are discussed.

> (1) In 1977, a 20,000 gallon storage tank filled with highly flammable waste (a solvent and ethyl acetate) exploded at a chemical disposal site in New Jersey. Eleven other storage tanks were ruptured in the blast, releasing heavy chemical fumes. Three tanks were blown into the air and thrown several hundred feet across the plant. The tanks were interconnected by a common vapor recovery system which could have allowed the flame to propagate through the system to all the tanks. The tanks were being renovated by a contractor at the time of the fire. The suspected cause of the explosion is improper welding, a smoldering cigarette or some other worker-related incident. Six workmen were killed and 30 others injured.[1]
>
> (2) Lagooned wastes from a copper reclamation company in Noxamixon Township, Pennsylvania, had been the source of groundwater, stream, and soil contamination there. The company, which was in operation from 1965 to 1969 bought industrial wastes from other plants, extracted copper, and stored the rest of the toxic liquids in lagoons. Three of the cement lagoons developed open seams on the bottom and leaked toxic fluids into an adjacent creek, killing all aquatic life. After an injunction was issued requiring the wastes to be treated, the company defaulted, leaving 3 1/2 million gallons of toxic wastes on the site. Heavy rains in April 1970 caused the lagoon to overflow and spill the hazardous wastes (e.g., acids, copper,nickel, and iron chloride) into the creek which is a tributary of the Delaware River. County officials then built a dike around the area. Soil contaminaion persists at the site and the entire area is devoid of vegetation. In 1971, the wastes were finally neutralized and ocean dumped.[2]
>
> (3) An open gate valve in a retention lagoon at a chemical company in Venango County, Pennsylvania released phenolic substances to Oil Creek. Some fish and turtles were killed in the Creek.[3]

(4) A firm engaged in the disposal of spent chemicals was storing and disposing of toxic chemicals at two Louisiana locations. At one of these site, several thousand drums of waste (some with and some without lids) were in storage. Many of the drums were leaking, and visible vapors were emanating from the area. As a result, all of the pine trees beside the storage area were killed.[4]

(5) An employee transferred two 5-gallon cans of waste vinyl cyanide and water from a still to a supposedly empty waste drum. As the employee rolled the drum to a storage area across the road, it exploded. Waste materials sprayed the employee. The drum was thrown approximately 48 feet, wrapping around a steel guard post. The employee received thermal and possible chemical burns to both feet. The exothermic reaction that caused the drum to rupture was probably a combination of cyanoethylation and polymerization.[5]

(6) In 1978, the owner of a facility in Dallas, Texas, who had declared bankruptcy, left behind the following items on his property: parts of an incinerator which burned during a fire, acid and alkali recovery basins with a "homemade" fiberglass liner, a variety of storage tanks, approximately 150 55-gallon drums, a landfill, and a number of other small containers of chemicals. The facility owner had been in the business of storing and processing a variety of wastes, which included car-wash and grease-trap wastes, chromium sludge, acid and alkaline wastes, plating waste, cyanide, ketones, tannings, and aromatic solvents. Water samples, from monitoring wells, at a depth of approximately 10 feet detected metal contamination.[6]

(7) The Chem-Dyne Corporation occupies approximately 4 acres in downtown Hamilton, Ohio Thousands of 55-gallon damaged, rusty and leaking drums and seven large tanks contained 1-1/2 million gallons of hazardous chemical wastes on the site. Since 1976, the site has received shipments of hazardous wasts which have been transferred between containers or mixed in open pits on the site. The site presents an imminent fire hazard from the improper storage of the flammable organic materials. Runoff has shown the presence of toxic chemicals which have leached into the soil and possibly to the groundwater. In addition to foul odors from the site, there have been instances of periodic illness of nearby workers and occasionally of people using the nearby recreation facilities.[7]

(8) On the night of June 3, 1977, unknown persons entered the Destructo Chemway Corporation property and

opened the valves of six large storage tanks, spilling approximately 30,000 gallons of wastes onto the ground. The company did not have a secondary containment system for the storage areas as required by SPCC, and the chemical wastes very quickly draind from the site to a small stream 1/4 mile away. Dead fish were observed floating on the 22-acre reservoir, which served as the primary water supply for Kennersville, North Carolina. Analysis of the water showed the presence of fuel oil, toluene, allyl ether, xylene, dichloroethane, and trichloroethane.[7]

(9) Summit National Liquid Services, a liquid industrial waste treatment and disposal company is located on an 11 acre site in Portage County, Ohio and has been in operation since 1973. The site is within 200 feet of residential areas and rainwater runoff carries chemicals and oils from the site to a tributary of the Berlin Reservoir which is used to augment a public water supply for the Mahoning Valley. As of February 1980, several thousand leaking barrels, a 300,000-gallon cracked and leaking concrete storage tank, and other vessels of varying sizes were used to store wastes including acetone, MEK, toluene, latex, oils, hexachlorocyclopentadiene and mirex. The site presents a fire hazard from the improperly stored barrels and is a source of soil and groundwater contamination.[7]

(10) In September of 1977 the McKin Company was ordered to close by town officials of Gray, Maine, due to drinkinng water well contamination associated with the site. The facility was built in 1972 to handle waste oil from the "Tamano" oil spill in Casco Bay. From 1972 until 1977, the primary operation was as a transfer station fro fuel still bottoms. Materials stored in existing tanks were mixed together for final shipment to rerefiners. Approximately 100,000 to 200,000 gallons were annually processed by McKin at the Gray site.

There was evidence that wastes were spilled at the processing facility and leached into the groundwater aquifer. An unpleasant taste and offensive odors in the drinking water were reported in 1974. Samples of drinking water were submited to the state laboratory for testing, but the contaminants were not identified. The well water discolored laundry, and so the residents started turning to alternate sources for their water supply.

In 1977, trichloroethane, trichloroethylene, freon, acetone, xylene, dimethyl sulfide, trimethylsilanol, and alcohols were identified. Toxic organics were detected in eitht domestic wells within 2,000 feet of the McKin Company.

As a result, the town health officer ordered sixteen contaminated wells in the area capped. Traces of these same chemicals were also discovered in the town's public water supply where contaminants are thought to have leached into the water table from the town dump where the company disposed of its chemical wastes.[7]

(11) A coal tar waste tank in Visalia, California leaked for four to five years, contaminating soil and groundwater in the vicinity of the spill with pentachlorophenol. Apparently the contamination is confined. Southern California Edison, which assumed all responsibility for the spill, has paid $2,000,000 for cleanup.[7]

(12) National Rolling Mills in Malvern, PA stored sodium cyanide used as a bath in the metal plating process in an underground tank. In April 1979, the underground tank leaked due to corrosion. One hundred twenty six thousand gallons of sodium cyanide were discharged to the surrounding soil at a rate of 300 gallons per minute. The sodium cyanide solution contaminated the ground water underlying the facility and flowed down gradient to Valley Creek which feeds the Schuykill River. Aquatic life was wiped out on an 8 mile stretch of Valley Creek. The groundwater supply to wells used be a nearby lumber company also was contaminated. The Pennsylvania Department of Environmental Services and the PA Fish Commission were called in to assess the damage.[8]

(13) Superior Tubing Co. in Collegeville, PA. stored trichloroethylene (TCE) in tanks for use in degreasing stainless steel tubing. In July 1979, due to a plumbing accident in which a plumber misapplied two valves to pipes leading from a tank of TCE, 1900 gallons of the chemical were discharged out of the tank and eventually ran down a storm drain into the Perkiomen Creek. TCE contamination was evident in the more shallow aquifers. Due to the extent of ground-water contamination, a public water empergecy was declared. Local wells were shut down, and bottled water brought into the community for months. State and federal governmental authorities recommended installation of a secondary containment system in order to prevent similar future incidents.[9]

(14) Two tank spills occurred at the Atlas Powder Co. in 1977. The firm, which manufactures explosives, is located in Tamaqua, PA. In January, plumbing misconnections precipated a routing of sulfuric acid out of the tank rather than into the process operations of the plant. 3,500 gallons of sulfuric acid were spilled into Brushing Run, which leads into the Little Schuylkill River. In August, a leak from a tank of ammonium nitrate allowed a release of 500 gallons of the chemical into the river. The leak

caused a fish kill in the river. The State and federal governments recommended the installation of a secondlay containment system to hold any future released chemical, and an automatic alarm system to alert facility personnel of a release.[9]

(15) A spill of trichloroethylene at the American Safety Razor Co. in Virginia occurred in August 1980. The spill was caused by plumbing misconnections in which TCE was accidentally pumped out of the tank instead of into the operational process line of the plant. 2,000 gallons of TCE were eventually discharged, and ground-water was contaminated. A secondary containment system was viewed by State and federal authorities as a means to prevent this type of incident in the future.[9]

(16) Germanium oxide was stored in tanks at ICI United States, a company situated in Hopewell, VA. In October 1976, a spillage of this chemical occurred due to incorrect valve positioning on the tank, and 500 gallons of germanium oxide eventually ran into a storm water drain and into the James River. Governmental authorities recommended modification to the plant plumbing system and the construction of a diking system in order to contain future spills.[9]

(17) A Union Carbide plant in South Charleston, West Virginia utilized 2-ethylenebutyric acid in its operations. The chemical was stored in tanks at the plant. In May 1977, one of these tanks overflowed, and 264 gallons (or 6500 lbs.) of 2-ethylenebutyric acid were spilled and eventually washed into the storm water drain and into the Kanawha River. No cleanup was possible. At the time of the spill, there was no secondary containment system in place in the section of the plant in which these tanks were stored.[10]

(18) 2001 Inc. (current owner), and Southeastern Chemical Co. Inc. (previous owner) produced, stored, and disposed of inorganic and organic chemicals and their waste products at their site near Reserve Louisiana. Southeastern disposal of wastes in a large undrained and uncapped 2000 sq. ft. sludge pit, drummed containers and storage tanks. Thirty storage tanks with a capacity of 375,000 gallons are on site. The tanks are rusting corroding and weathering, and twelve tanks still have significant quantities of hazardous materials remaining, some of which is leaking. An inadequate storage and dike system cannot prevent chemical escape and mixture. All chemicals eventually either seep into the ground or flow into a canal leading towards lake Maurepas.

The government is seeking relief pursuant to the following legal theories; Section 7003 of the Resource Conservation and Recovery Act (Defendant has created an enjoinable imminent hazard that may result in the violent and/or dangerous escape of chemicals); Section 303 of the Clean Air Act (Defendant has created an enjoinable imminent hazard that has actually and will potentially emit toxic air pollutants); Section 504 of the Clean Water Act (Defendant is discharging hazardous chemicals into a navigable water of the USA which is an enjoinable imminent and substantial endangerment.)[11]

(19) Stanley Kessler Company, Inc. (Kessler), is a welding rod and wire manufacturing facility located in King of Prussia, Pennsylvania. According to the Complaint, chemicals used during manufacturing operations were disposed of at the facility and are migrating into and contaminating underlying groundwater, and have entered and are likely to continue to enter the Upper Merion reservoir, a public water supply serving approximately 800,000 people.

An aquifer known as the Conestoga Formation is partially located beneath the site, at an approximate depth of 65 feet. Groundwater in the aquifer migrates towards the reservoir.

Kessler uses organic solvents to degrease welding wire during production. Beginning about 1960 and continuing until 1980, solvents are alleged to have been disposed of through floor drains in the facility wich discharge into two underground tanks. According to the Complaint, the 1000 gallon and 500 gallon tanks were built to allow their contents to leak into the ground.

Trichloroethylene (TCE), an organic chemical that is a known carcinogen, tetratogen, and mutagen, has been detected in large quantities in the 1000 gallon tank, in the groundwater beneath the facility, and in the reservoir. As the Philadelphia Suburban Water Company's treatment system was not designed to remove TCE from the water, numerous people could be affected. The Complaint also states that there is a substantial risk that the level of TCE in the reservoir will increase.

Relief is sought pursuant to section 7003 of the Resource Conservation and Recovery Act (the wastes are hazardous and present an imminent and substantial endangerment to health and the environment) and section 1431 of the Safe Drinking Water Act (contaminants in the ground and in the groundwater pose an imminent and substantial endangerment to the health of persons and to the area drinking water supply.)[12]

(20) Union Corporation and Metal Bank of America own and operate a disposal site on the bank of the Delaware River on Cottman Avenue in Philadelphia. The Complaint alleges that the Defendants used the site to drain transformers containing PCB contaminated oil, and stored the waste oil on-site. According to the Complaint, soil, groundwater, and surface water contamination by PCB's has resulted from the Defendants' storage activities.

The City of Philadelphia Torresdale Drinking Water Plant is on the Delaware River and is within the zone of tidal influence from the site. The plant supplies water to over 1 million people, including over 50% of the populations of Philadelphia and of lower Bucks County. While the threat of contamination is a continuing one, PCB's have not been detected at the Torresdale intake in recent months.

The site was built by filling in a section of the river with fill material. The fill operation began in 1968 and was completed the same year. The Complaint alleges that Metal Bank began bringing the PCB contaminated transformers onto the site in 1968, and continued to doe so until 1972. PCB's are toxic to aquatic invertebrates and fish, are persistent, are a proven carcinogen, and are bioaccumulative

The Complaint asserts that employees of the Defendants drained the transformers of oil and PCB contents into an underground storage tank. The PCB's were allowed to leak from the tank into a layer of fill which had been placed on the site. According to the Complaint, there are now pools of oil and PCB's in the soil beneath the site. As a result, the Complaint assets, the groundwater under the site has been contaminated with the PCB's.

The suit alleges that PCB's are in oil and water layers under the site. PCB's are currently leaching from the underground tank and the oil saturated fill layer into the Delaware River. The Complaint asserts that this has been occurring since at least April 18, 1978. Also alleged is that PCB contaminated water from underneath the site has leached onto the riverbank and into the River.

More than $67,000 of Federal funds had been spent by the Plaintiff as of April 1980, to determine the nature and extent of the PCB problem, nd for determining an appropriate method of relief. The Suit alleges that the Defendants have refused and/or failed to take action to prevent the PCB's from leaching into the Deleware River.[13]

IV. State Legislation

EPA reviewed the solid waste management regulations and guidelines of several States to ascertain the various State approaches to regulating the storage and treatment of solid and/or hazardous waste in tanks and in other types of facilities used to treat wastes. The following is a synopsis of those aspects of the States' regulations or guidelines which the Agency used as models in developing the RCRA standards for these facilities.

Several States' regulations or guidelines have standards which specifically address the incompatibility of stored and/or treated wastes with each other, or with the construction materials of the containment devices (i.e., containers or tanks) in which the wastes are treated or stored. For example:

- Texas[14], Louisianna[15], and Tennessee[16] prohibit placing incompatible wastes together in the same containment device. However, Texas' Guidelines provide an exception to this rule where the placement of incompatible wastes in the same containment device is done for controlled neutralization of acids and alkalies.[17]
- Texas[18] and South Carolina[19] prohibit adding hazardous waste to an unwashed containment device that previously held a material or waste with which it is incompatible.

- Minnesota[20] requires tanks to be constructed of materials, or protected by a liner, that will not react chemically with the contained waste, if such a reaction may impair the tank's ability to contain the waste. Louisiana[21] has a similar requirement, but it specifies that the construction materials of the containment device must be resistant to the emplaced waste for at least the estimated life of the operation. A bond, or warranty satisfactory to the Secretary of Louisiana's Department of Natural Resources is required for construction materials or liners for which historical performance data are not available.
- Texas[22] and Louisiana[23] require tests to be conducted for determining the compatibility of the waste to be contained with the construction materials of the containment device, or with the liner used to protect them.*

In addition to standards which deal with incompatibility, the following other State standards were also used as prototypes in developing the Subparts J and Q interim status and general standards:

- Texas[24] specifies that all ponds (which include containment devices comparable to uncovered tanks) should have adequate freeboard. The suggested height of the freeboard varies from 1 1/2 to 2 feet, depending upon the characteristics of the waste. For example, Texas' standards specify that Class IA waste (which includes those wastes which are classified to be hazardous in Section 3001 of the RCRA rules) should be contained in ponds with 2 feet of freeboard.

---

*Louisiana's regulations gives owners or operators the option of collecting data (presumably from the literature or from other facilities) in lieu of prforming the tests themselves.

- Louisiana[25] requires that before introducing any new or altered hazardous waste into an existing or new treatment sequence, pilot or bench scale tests, or reliable operating data, must be obtained for the waste.
- Louisiana requires that a spill containment area capable of containing the waste in case of a spill shall surround the tank. Capacity of the containment area must equal the capacity of the tank plus precipitation resulting from a 24-hour, 25-year storm.[26]
- Wyoming requires that all hazardous waste sites, including storage tank areas, be designed, located and operated in such a manner that there will be no hydraulic surface or subsurface connection between flowing or standing water and to contain any runoff from accidental spills at the site.[27]

- ~~New York regulations on the bulk storage of hazardous materials stipulates that for every site where hazardous materials are stored, the area shall be entirely surrounded by a continuous dike or wall capable of containing the total volume of the largest storage unit holding a stored hazardous liquid material. The construction and composition of such dike or wall shall be such as to prevent the escape or movement of a stored liquid hazardous material from the site.[28]~~

- The Iowa Solid Waste Disposal Rules require that storage facilities shall:

  1) Have a smooth, impervious, easily cleaned base.
  2) Provide leachate collection.
  3) Prevent runoff entering the facility from adjacent areas.[29]

3. ANALYSIS OF THE INTERIM STANDARDS, ORGANIZED BY SUBJECT

I. Subject: The Definitions of "Basin" and "Storage Tank"

A. Proposed Definitions:

"Basin" means any uncovered device constructed of artificial materials, used to retain wastes as part of a treatment process, usually with a capacity of less than 100,000 gallons. Examples of basis include open mixing tanks, clarifiers, and open settling tanks.

"Storage Tank" means any manufactured non-portable covered device used for containing but not treating hazardous waste. (As defined in §250.41.)

"Storage Tank" means any manufactured non-portable covered device used for containing pumpable hazardous waste. (As defined in §250.21.)

B. Rationale for the Proposed Definitions:

BASIN: The purpose of the proposed wording of the definition of "basin" was to help owners or operators decide if the uncovered containment devices in which they treat hazardous waste are "basins" or "surface impoundments". This distinction was important because the proposed requirements for surface impoundments were far more rigorous than they were for basins.

The primary characteristics which distinguished basins and surface impoundments in the proposed rules was the type of materials used to build the containment devices. Basins were made out of man-made, "artificial materials" (e.g., steel, plastic, concrete). Surface impoundments, on the other hand, could be lined by "artificial materials" (e.g., PVC), but the construction material that provided structural support for surface impoundments was earthen material (e.g., natural in-place soil, or reworked/reconstructed soil).

A secondary characteristic which the Agency believed could be helpful to distinguish between basins and surface impoundments was size. Because man-made materials are typically more expensive than earth, basins tend to be smaller than surface impoundments. Based on the Agency's belief that most basins hold less than 100,000 gallons, the definition of "basin" contained a statement to this effect.

STORAGE TANK: The Agency mistakenly provided two different definitions of the term "storage tank" in the proposed rules, one in §250.21, and the other in §250.41. The two proposed definitions were similar in that they defined a storage tank to be any manufactured non-portable covered device used to store hazardous waste. However, the definition provided in §250.41 also stated that the waste contained in storage tanks is pumpable. This was not intended and has been removed from the final definition.

The purpose of the proposed wording of the definition(s) of "storage tank" was to help owners or operators decide if their covered containment devices were "containers" or "tanks". Again, the ability to make this determination was important because some of the proposed requirements for containers were different from those for tanks.

The primary characteristic which distinguished containers and tanks in the proposed rules was size. Containers were small enough to be portable, whereas tanks were too large to be portable (i.e., they are stationary).

C. Summary of Comments:

Regarding the definition of "Basin":

1. The word "uncovered" should be deleted.
2. The definition should specify whether the term "artificial material" means man-made, manufactured, not natural in place, or something else.
3. The volume restriction of 100,000 gallons should be deleted, because containment devices constructed of man-made materials frequently have a capacity greater than 100,000 gallons.
4. The public normally understands the word "basin" to mean a geologic or topographic depression or a small bathroom or kitchen bowl; therefore, the term should not be used to stand for a large device constructed of artificial materials.

Regarding the definition of "Storage Tank":

5. The word "covered" should be deleted because:
   - the storage of a non-volatile waste does not require a covered tank.
   - the word is not part of the commonly understood meaning of "tank". The special need for "covered" devices is properly addressed elsewhere in the proposed regulations, with respect to storing volatile materials.
   - the word "covered" places an unwarranted

limitation on facilities which would be considered storage tanks.

- an uncovered steel tank would be designated as a "basin". Consequently, it would require ground water monitoring, even though the absence of a cover -- by itself -- does not significantly increase the potential for contaminating ground water.

6. The word "pumpable" should be deleted from §250.41(b)(84) because:

   - it makes this definition inconsistent with the definition of the same term given in §250.21(b)(27).
   - the definition does not specify the circumstances under which the material must be "pumpable". In some instances, material may be liquid and "pumpable" going in, but may become non-pumpable during storage -- e.g., because of evaporation, or reaction, or solidification, etc.
   - the storage of solid or semi-solid wastes should be permitted.

D. Analysis of and Response to Comments:

The Agency's re-evaluation of its conception of storage for regulatoy purposes now permits storage to be conducted in uncovered as well as covered devices, and in devices such as surface impoundments. Thus basins, as they were defined in the proposed regulations, are now recognized as appropriate storage devices. In addition, the Agency has recognized that treatment as well as storage may be conducted in tanks. These changes have made the proposed regulations' concepts of basins and storage tanks essentially identical, with the exception that one is uncovered and the other is covered. As a result, the Agency has combined the two concepts into one: a tank is now defined to be "a stationary device, designed to contain an accumulation of hazardous waste, which is constructed primarily of non-earthen materials ... which provide structural support." Tanks are referred to as covered or uncovered when appropriate. The terms "basin" and "storage tank" have been deleted from the final rules.

These revisions should satisfy most of the objections to including "uncovered" in the definition of "basin", and "covered" in the definition of "storage tank"; these objections appear to reflect mainly a discontent with restricting basins (uncovered tanks) to treating waste, and storage tanks (covered tanks) to storing it. The final rules also contain no standards requiring the use of covered tanks. As explained in the background document on Storage and Containers, the purpose of requiring tanks to be closed was to control air emissions. However, air emissions are primarily a problem for volatile waste, and the Agency has deferred issuing any rules concerning volatile waste.

The meaning of the term "artificial materials" was unclear in the proposed definition of "basin" and has been replaced by the words "non-earthen ... (e.g., wood, concrete, steel, plastic)" in the final definition, to make clear the types of construction materials which can be usd to build a tank.

The proposed definition of "basin" stated that they usually had a capacity of less than 100,000 gallons. The Agency did not intend owners or operators to interpret this to mean that containment devices which hold more than 100,000 gallons are excluded from the definition of basin. Rather, the statement was included in the definition as general guidance to help differentiate between basins and surface impoundments. However, since the statement seems to have confused, rather than helped the regulated community to distinguish between basins (uncovered tanks) and surface impoundments, the Agency has deleted the reference to the capacity of tanks from the final rules.

The Agency also agrees that tanks need not be restricted to holding "pumpable" waste, and this requirement has been deleted.

II. Subject: The Definitions of "Treatment" and "Treatment Facility

A. Proposed Definition:

"Treatment" has the same meaning as that given in Section 1004 of the Act.

"Treatment Facility" means any facility which treats hazardous waste.

B. Summary of Comments:

1. The definition of "treatment" should exclude:

(a) operations performed to meet Clean Water Act requirements (i.e., it should exclude pretreatment of wastewater to be discharged to POTWs). Otherwise, wastewater streams would be subject to dual regulation -- and this is inconsistent with Section 1006 of RCRA, which requires integration with other environmental laws.

(b) Processing methods and techniques which are designed to reduce the volume or quantity of a waste being generated.

(c) Processing operations which separate oil and water by gravity, because the reporting requirements for these facilities would be staggering.

2. The definition of "treatment facility" should exclude, or differentiate these facilities, from resource recovery facilities.

3. The proposed rules are inequitable because they regulate differently two facilities which treat waste in an identical manner. Where waste is rendered non-hazardous by being piped directly to a processing facility, the facility is not subject to control under Subtitle C. However, a facility which renders its waste non-hazardous with an identical process, but after the waste has passed through a surface impoundment, is subject to control under Subtitle C. In order to eliminate this inequity, the definition of "treatment facility" should exclude any facility where the waste flows, on a substantially continuous basis, directly from the point of generation, or

through a storage facility or surface impoundment, to a processing facility.

4. Facilities which treat their waste on-site (e.g., universities or hospitals which treat waste before it leaves the premises) should be exempt from the requirements of Sections 3004 and 3005. Otherwise, in a chemistry lab, every chemical on the shelf that has been used once might be considered to be a waste, and every successive experiment might be considered to be a treatment facility.

C. Analysis of and Response to Comments:

1a. The regulations promulgated under the Clean Water Act (CWA) are designed to prevent the discharge of pollutants to surface waters. The regulations promulgated under Subtitle C of RCRA, on the other hand, are designed to prevent the discharge of hazardous waste to ground water, as well as surface waters. In those cases where treatment facilities regulated under the CWA contain hazardous waste, this waste may seep through the bottom of the facility to the ground water, as well as flow over the rim of the facility for surface waters. For this reason, the Agency believes that these facilities must be subject to the regulations prescribed under Subtitle C of RCRA, as well as the regulations prescribed under Section 402 of the Clean Water Act.

The final rules do not exclude the pretreatment of all wastewater discharged to POTWs from regulation under

RCRA. The exclusion only applies to domestic sewage or mixtures of domestic sewage with other wastes that pass through a sewer system to a POTW. The rationale for this is contained in the Part 261 background document supporting the exclusions under §261.4(a).

1b. Processing operations which reduce the volume of a waste already generated cannot be excluded from the definition of "treatment" because RCRA expressly defines "treatment" of hazardous waste, to include any method, or process, ... designed ... to render such waste ... reduced in volume" (emphasis added). However, neither RCRA nor these regulations are intended to govern changes to production processes made to reduce the volume or quantity of wastes generated.

1c. & 2. For this same reason, the Agency is also unable to modify the definition of "treatment" to exclude gravity oil/water separation processes. However, if the purpose of the separation process is to extract the waste oil for reuse, rather than for disposal, the waste oil separation process would be a resource recovery facility, and would be exempt from regulation under the final Phase I Section 3004 regulations. (see the Part 261 background document supporting the exclusions under §261.4(b)).

3. The final rules do not exclude all processing facilities in which hazardous waste is received directly from a production process. Only those which meet the definition of a "totally enclosed treatment facility" are exempted from these rules. The key characteristics of such a facility

are that it:

- does not release any hazardous waste or constituent of hazardous waste into the environment during treatment, and
- it is directly connected to an industrial production process.

The Agency has exempted these facilities from regulation under Subtitle C because they do not release wastes or waste constituents into the environment, and therefore stringent controls are not "necessary to protect human health and the environment". Such controls might also discourage the use of such facilities, which in many ways represent the optimum in good waste management practices. It may also be very difficult, as a practical matter, to permit or otherwise regulate these types of facilities -- many are indoors, are part of complicated plumbing systems which do not fall within RCRA's jurisdiction, and do not have clearly defined starting and end points.

After treatment in a totally enclosed treatment facility, the resulting discharge, treatment residue, etc., may be a hazardous waste and subject to regulation under Subtitle C. Owners and operators of such facilities should consult §261.3 of the Part 261 rules to determine whether that is the case.

Hazardous waste treatment facilities which receive wastes from a surface impoundment do not pose any of the practical problems mentioned above. They are not hard to distinguish from the production processes, and have discrete beginning and end points. They are thus more practical to examine in the permitting process. In addition, a generator with a totally enclosed treatment process would need no facility permit at all, and requiring him to obtain a facility permit would create a substantial burden for both the Agency and the owner or operator with little corresponding gain. On the other hand, a facility with a surface impoundment will require a facility permit in any event, and it should be practical and relatively simple to obtain a treatment permit for an otherwise totally enclosed treatment process at the same time. These factors indicate a sensible regulatory distinction between a "totally enclosed treatment facility" at the end of a generator's production process and a similar facility which draws its wastes from a surface impoundment.

4. The Agency disagrees with the comment suggesting that the Section 3004 and 3005 standards should only apply to off-site treatment facilities. These regulations are designed to ensure that hazardous waste facilities do not pose a threat to human health and the environment. Potential hazards are certainly not posed uniquely by off-site treatment facilities. Because on-site treatment facilities pose a potential threat to human health and the environment equal to that posed by off-site treatment facilities, the final rules apply to both types of facilities.

However, the Agency does not expect that many university chemistry labs will be treatment facilities. The reason is that the chemicals used for the purpose of experimentation are not deemed to be wastes until the experiment is over and the resulting residue needs to be stored, treated, or disposed. That is, the experiments performed in labs are not considered to be treatment processes because the substances used to run the experiments are hazardous chemicals, not hazardous waste.

D. Final Definitions:

"Treatment": (see page 10 above)

"Totally enclosed treatment facility": (see page 10 above)

The definition of "treatment" in the final part 260 rules is substantively the same as that which was proposed. The Agency has rearranged the order of certain phrases in the proposed definition in order to make it easier to understand.

The proposed definition of "treatment facility" has been deleted from the final rules because its meaning was obvious and, therefore, defining the term was unnecessary.

III. Subject: Compatibility of the Waste with the Containment Device and/or its liner

A. Summary of Proposed Standards 250.44(h), 250.45-4(b)(1), (d), and (e), and 250.45-6(a) and (b)(2):

The proposed standards required that the materials used to build containment devices (i.e., tanks, basins, and other types of treatment facilities), or the liners used to protect them, must be compatible both with the hazardous waste to be stored or treated, and with the treatment reagents that are expected to be used:

- under expected operating conditions (250.45-4(e) and 250.45-6(a));
- so that the ability of the containment device to contain the waste is not impaired (250.44(h)).

The proposed standards further required that the waste to be treated in containment devices must be tested to determine if the waste, or the reagents to be used to treat the waste, will have any detrimental effect on the containment device (250.45-4(d) and 250.45-6(b)(2)).

Wastes which would damage the construction materials of a basin were not allowed to be placed in the basin (250.45-4(b)(1)).

B. Rationale for the Proposed Standards:

The service life of a containment device can be prematurely shortened because of harmful interactions between its construction materials and the waste or reagents it contains. This interation may include one or more of the following:

(1) Corrosion: Corrosion of containment devices may be accelerated by the properties of the hazardous waste itself, or by the chemical reagents used to treat the

waste. For example, pickling liquors from metal processing are corrosives. Therefore, it would be inappropriate to treat or store pickling liquors in a steel tank unless the tank is lined with a material which is resistant to corrosion (e.g., glass, polyethylene, or PVC).

(2) Salting and scaling: Salting and scaling is the formation of an insulating layer at heat transfer surfaces, which could contribute to the failure of evaporation tanks and the subsequent escape of hazardous waste to the environment. Salting and scaling may be reduced or prevented by the preliminary treatment of the influent waste stream or by other operational controls.

(3) Pressure: High pressure (caused, for example, by mixing wastes which collectively generate large amounts of gaseous emissions) may cause covered containment devices to explode, unless the device has been designed to withstand high pressure.

(4) Liquid flow rate and mechanical abrasion: Mechanical abrasion from materials contained in the waste or high liquid flow rates may damage the construction materials of a containment device. In order to prevent this, it is important to match the construction material of the device with the abrasion characteristics of the waste expected to be treated and the anticipated liquid flow rate of the treatment process.

The purpose of the proposed standards was to prevent these sorts of adverse interactions. This was necessary in order to prevent the premature deterioration of containment devices and the subsequent discharge of the waste they contain to ground water or surface water.

C. Summary of Comments Received:

1. It is unrealistic to try to protect basins from "any detrimental effect" which may result from containing a waste which is incompatible with the basin's construction materials because all construction materials have an intended useful life (i.e., a design corrosion rate). Owners or operators should be allowed to choose between a construction material with a relatively short intended life (e.g., carbon steel, with an intended life of five years), which requires frequent replacement of the basin, vs. a construction material with a relatively long intended life (e.g., stainless steel, with an intended life of ten to thirty years), which allows less frequent replacement of the basin. Therefore, the phrase "any detrimental effect" should be replaced by the phrase "any effect which would cause the basin to fail prior to closure, or prior to the ends of the basin's intended life".

2. The restriction on placing waste in a basin, where the waste is detrimental to the basin's construction materials, will preclude the presently desirable waste management practice of mixing spent alkaline with spent

acid for the purpose of neutralization -- because these wastes will cause corrosion when tested on the construction materials of the basin. The standard should be revised to allow wastes, which by themselves would corrode a basin, to be placed in the basin for the purpose of chemical reaction under controlled conditions.

D. Analysis of and Response to Comments:

1 & 2. The Agency agrees with the commenter's general argument that containment devices need not be designed to last forever. Although the Agency would prefer that hazardous waste be treated or stored in devices which will not be detrimentally affected by these operations, the Agency recognizes that, inevitably, the construction materials of most containment devices will be somewhat impaired by the physical or chemical properties of the waste they contain.

The Agency's concern is not so much the gradual deterioration of a containment device -- as long as this deterioration is monitored, and the device is repaired or replaced as needed (see the §265.15 inspection requirements) -- as with the rapid impairment of a device's containment capabilities due to adverse interactions between the device's construction materials and the waste it contains.

In response to the comments, the final rules have been modified to prohibit placing wastes in containment devices if so doing would impair the ability of the device to contain the waste during its intended life. Unlike the proposed rule, the focus of the final standard is solely on placing wastes into devices. The proposed approach, which regulated both the types of materials used to build devices and the kinds of wastes that could go in them, was redundant. As long as the waste that is placed into the devices is controlled, the purpose of the proposed standard (i.e., to prevent the rapid deterioration of these devices) will be achieved.

E. Final Regulation Language:

§265.192 General operating requirement*

(b) Hazardous wastes or treatment reagents must not be placed in a tank if they could cause the tank or its inner liner to rupture, leak, corrode, or otherwise fail before the end of its intended life.

§265.401 General operating requirement*

(b) Hazardous wastes or treatment reagents must not be placed in the treatment process or equipment if they could cause the treatment process or equipment to rupture, leak, corrode, or otherwise fail before the end of its intended life.

IV. Subject: Continuous Feed Operations

A. Summary of Proposed Standard 250.45-6(g):

The proposed standard required that facilities which continuously feed hazardous waste into containment devices used to treat hazardous waste must have a waste feed cutoff or a by-pass system which turns on automatically when the treatment process breaks down.

B. Rationale for the Proposed Standard:

The Agency believed that it makes little sense to add hazardous waste to a containment device in which the waste already contained therein is not being treated effectively. In addition, where the breakdown of the treatment process poses a threat to human health and the environment (e.g., when an unanticipated reaction between a reagent and a waste generates excessive heat), the inflow of additional waste into the device may exacerbate the problem and thereby increase the dangers associated with the malfunction of the treatment process.

Therefore, the Agency believed that facilities with continuous feed operations should be equipped with fail-safe mechanisms (i.e., waste feed cutoff or by-pass systems) capable of stopping the flow of waste into a containment device in which the treatment process is not working.

C. Summary of Comments Received:

1. It is unnecessary to require that automatic waste feed cutoff or by-pass systems be installed in all treatment facilities. Instead, the standard should:

- allow a facility to use other mechanisms (e.g., dikes or collection ponds) which will contain waste discharges if a malfunction occurs;
- require that a facility have adequate instrumentation and controls to ensure safe operating conditions.

2. The standard should be recast to acknowledge that not all malfunctions are severe enough to cause hazardous waste to be discharged to the environment. Automatic cutoffs or by-passes, if required at all, should only have to be triggered by malfunctions which might cause discharges.

3. EPA should clarify whether the use of the word "by-pass" in the proposed standard is meant to be interpreted in the way the chemical industry uses the term, i.e., "shunt, to the downstream side of a process or piece of equipment".

D. Analysis of and Response to Comments:

1. The Agency still believes that the best way to minimize the potential dangers associated with a system failure (e.g., a malfunction in the treatment process, or a crack in the tank) is to prevent additional waste from flowing into a tank. The Agency disagrees that facilities should be allowed to contain the overflow from a tank -- with dikes or collection ponds -- instead of preventing the inflow

of a waste to a tank. The Agency believes that every reasonable effort should be made to confine waste to the interior of a tank, and only after these efforts have failed, should waste be allowed to flow into secondary containment devices (e.g., dikes or collection ponds).

However, the Agency agrees that mechanisms other than those specified in the proposed standard should be allowed to prevent the inflow of waste to tanks. For example, a manual waste feed cutoff systems may be just as effective as an automatic waste feed cutoff system to prevent the inflow of waste to a tank. For this reason, the Agency has revised the standard in terms of a performance standard. The final standard requires that facilities at which hazardous waste is continuously fed into tanks be equipped with a means to prevent the inflow of waste to the tank, but it does not require that any particular method(s) be used to accomplish this objective.

2. The Agency recognizes that there may be situations where the malfunction of a treatment process does not pose a threat to human health and the environment (e.g., where an aerator is not aerating an industrial wastewater with 100 percent efficiency). In such situations, the addition of more waste to the treatment facility may not significantly exacerbate

the situation. The Agency agrees that under such circumstances, an owner or operator should not be required to prevent waste from flowing into a tank. Therefore, the final standard indicates that the equipment used to prevent inflow to a tank need only be activated in the event of a leak or overflow from the tank due to a system failure (e.g., a malfunction in the treatment process, a crack in the tank, etc.)

3. Because the Agency's use of the term "by-pass" is consistent with the way it is used in the chemical industry, and the way it is defined in the dictionary, the Agency believes that further clarification of the term in these regulations is unnecessary.

E. Final Regulation Language:

§265.192 General operating requirement*

(d) Where hazardous waste is continuously fed into a tank, the tank must be equipped with a means to stop this inflow (e.g., a waste feed cutoff system of by-pass system to a stand-by tank).

[Comment: These systems are intended to be used in the event of a leak or overflow from the tank due to a system failure (e.g., a malfunction in the treatment process, a crack in the tank, etc.)]

§265.401 General operating requirement*

(c) Where hazardous waste is continuously fed into a treatment process or equipment, the process or equipment must be equipped with a means to stop this inflow (e.g., a waste feed cut-off system or by-pass system to a standby containment device).

[Comment: These systems are intended to be used in the event of a malfunction in the treatment process or equipment.]

V. Subject: Freeboard

A. Summary of Proposed Standard 250.45-6(e):

The proposed standard required that at least two feet of freeboard be provided for each containment device used for treating hazardous waste.

B. Rationale for the Proposed Standard:

Hazardous waste may spill or splash over the rim of an open-topped containment device (i.e., uncovered tank or surface impoundment) for a number of reasons, which include:

- the acceleration of a treatment facility's liquid flow rate past that for which the facility is designed;
- careless pouring of additional waste into a partially full containment device;
- an unanticipated reaction between two incompatible wastes which causes them to boil-over;
- wave-action on a windy day in containment devices with large surface areas; and
- major precipitation.

The purpose of the required two feet of freeboard was to prevent such spilling or splashing and thus reduce the potential for spilled or splashed waste to contaminate ground water or surface water.

The Agency's choice of two feet as the required height of the freeboard was based on the State of Texas' guidelines for ponds, which specify that a minimum of two feet of freeboard should be maintained for ponds containing hazardous waste.

Additional support for requiring owners or operators to maintain at least two feet of freeboard in large, uncovered containment devices is contained in several technical documents (e.g., in the proceedings from a symposium on upgrading wastewater stabilization ponds[30], an EPA design manual for upgrading wastewater treatment plants[31], and an environmental engineers' handbook on water pollution[32]).

C. Summary of Comments Received:

In many cases, a freeboard of less than two feet will be sufficient to prevent hazardous waste from splashing or spilling during treatment. Therefore, a "note" should be added to the standard which allows using less than two feet of freeboard where:

- there is a collection and drainage area surrounding the reaction vessel which has restricted access during operation (the commenter did not explain exactly what he meant by the phrase "which has restricted access during operation");
- an equivalent degree of protection is provided.

D. Analysis of and Response to Comments:

The Agency agrees that secondary containment systems -- dikes, trenches, drainage to another treatment system, diversion to a stand-by tank, etc. -- may provide a degree of protection from splashing and spillage equal to that provided by two feet of freeboard. The interim status standards for tanks do not require secondary containment systems (see the Foreword of this document). However, the Agency believes that facilities with interim status should be allowed to use existing containment systems to prevent hazardous waste from spilling or splashing from tanks to the ground water or surface water. Therefore, the final interim status standard for tanks require that facilities have either (1) two feet of freeboard, or (2) a containment structure (e.g., dike or trench), drainage control system, or diversion structure (e.g., standby tank) which has a capacity that equals or exceeds the volume of the top two feet of the tank.

The Agency has not included a freeboard requirement in the final Subpart Q standards. Unlike tanks, which can be uncovered, to the Agency's knowledge the treatment processes regulated under Subpart are conducted in covered containment devices and maintaining freeboard in these devices is thus unnecessary.

E. Final Regulation Language:

§265.192 General operating requirement*

(c) Uncovered tanks must be operated to ensure at least 60 centimeters (2 feet) of freeboard, unless the tank is equipped with a containment structure (e.g., dike or trench), a drainage control system, or a diversion structure (e.g., standby tank) with a capacity that equals or exceeds the volume of the top 60 centimeters (2 feet) of the tank.

VI. Subject: Waste Analyses and Trial Treatment Tests

A. Summary of Proposed Standards 250.45-6(b) and (c)

The proposed standards required that waste analyses and trial tests be conducted in part in order to:

- identify the proper treatment technique for each type of hazardous waste treated at the facility;
- determine if the waste is contaminated with substances which might interfere with the treatment of the waste or damage the containment device; and
- ensure that each new or significantly different waste accepted at the facility can be treated effectively with the process used at the facility.

B. Rationale for the Proposed Standard

Carlessness and haphazard experimentation with different treatment techniques on large quantities of hazardous waste (e.g., the quantity which is contained in a tank) can adversely affect human health and the environment if the waste is incompatible with the treatment process or the chemical reagents used to treat the waste. For example, adding a strong oxidizing agent (e.g., chromic acid) to a steel tank full of an unknown waste may generate toxic fumes, excessive heat, fires, explosions, or may cause the tank to corrode rapidly.

The purpose of the proposed standard was to discourage the large scale "hit or miss" approach to hazardous waste treatment by requiring that an owner or operator conduct bench scale (or pilot scale) tests to determine the effectiveness and safety of the treatment technique intended to be used at the facility.

C. Summary of Comments Received:

1. Requiring that a hazardous waste be tested before placing it in a basin (§250.45-4(d)) is inappropriate when applied to the continuous flow of an industrial wastewater through a treatment process unit.

2. Requiring trial treatment tests for each new or significantly different waste accepted at a treatment facility may result in needless duplicative testing where the waste has alrady been shown to be compatible with the process in question at similar facilities.

3. A treatment facility should have to submit to the permit authority the type of information described in §250.45-6(b) and (c) before a significant new waste can be handled at the facility.

4. A list of analytical tests should be developed to help the owner or operator determine which processes are appropriate for the treatment of his waste. This list should include such tests as: total quantitive analysis, leach test, explosives testing, flammability tests, corrosivity tests, oxidative tests, and toxicity determinations.

5. The word "proper" in §250.45-6(b)(1) should be replaced with the word "appropriate" because the word "proper" suggests that there is only one treatment technique, feed rate, operating condition, etc. for a particular hazardous waste.

D. Analysis of and Response to Comments:

1. It was the Agency's intent, in the proposed rules, to require the testing of industrial wastewater flowing through a treatment process unit only (a) when the process is initially started up, (b) when the influent waste stream changes significantly, or (c) when the process used to treat the wastewater is changed or is significantly modified. The final rules have been redrafted along these lines.

2. The Agency agrees that an owner or operator should not have to perform waste analyses or trial tests where the information needed to ensure that the regulations will be complied with has been obtained at, and is available from other facilities which have performed similar storage or treatment of similar waste under similar operating conditions. Therefore, the regulations have been revised to exempt owners or operators from the waste analyses and trial test requirements where such information is available from other sources. However, reliance on information from other facilities does not relieve

the owner or operator of primary responsibility should the information he has obtained from other sources prove to be incorrect, and damage to human health or the environment occurs.

3. It might be desirable for EPA to review the results of each waste analysis and trial test before a new or significantly different waste could be handled at a facility. This review would enable EPA to prevent the storage/treatment of waste where the Agency believes the owner or operator has misinterpreted the results of the tests with respect to a planned course of action. However, the number of reviews which EPA would have to conduct if it required owners or operators to obtain EPA review of their test results before a new or significantly different waste could be managed, makes such a requirement impractical because EPA lacks sufficient manpower to provide a timely turn-around of the test results. In addition, it is unclear whether the added increment of safety is enough to be worth the added burden to the Agency and to owners and operators. Furthermore, the results of these waste analyses and trial tests will be available to the Regional Administrator. Because these results will be reviewed

when the facility's application for a permit is evaluated, the Agency believes that this review process will enourage owners or operators to conduct thorough analyses/tests and to take the course of action which the test results indicate should be taken.

It should be noted that the final interim status standards do not include a revision of paragraph (iv) and (v) of proposed §250.45-6(b). These parts of the proposed standard dealt with issues (i.e., volatile and highly toxic substances) for which EPA is deferring action. Therefore, although prior review of test results is not required for the final interim status standards corresponding to proposed §250.45-6(b)(i), (ii) and (iii) the Agency is deferring its decision as to whether Agency review of the test results will be required before the waste can be managed where the tests indicate that highly toxic substances or toxic air emissions will be generated during the intended storage or treatment process.

4. The Agency agrees that owners or operators should be given guidance to help them select an appropriate process to treat their waste. The Agency is in the process of developing a guidance manual which will describe the types of analytical tests requested by the commenter.

5. The Agency agrees that there may be a number of treatment techniques, chemical reagents, operating conditions, etc. that are appropriate for the treatment of a particular waste. Any implication that there is only one "proper" treatment process for each type of waste has been eliminated from the final rules.

E. Final Regulation Language:

§265.193 Waste analysis and trial tests*

In addition to the waste analysis required by §265.13, whenever a tank is to be used to:

(1) Chemically treat or store a hazardous waste which is substantially different from waste previously treated or stored in that tank; or

(2) Chemically treat hazardous waste with a substanially different process than any previously used in that tank;

the owner or operator must, before treating or storing the different waste or using the different process:

(1) Conduct waste analyses and trial treatment or storage tests (e.g., bench scale or pilot plant scale tests); or

(2) Obtain written, documented information on similar storage or treatment of similar waste under similar operating conditions;

to show that this proposed treatment or storage will meet all applicable requirements of §265.192(a) and (b).

[Comment: As required by § 265.13, the waste analysis plan must include analyses needed to comply with §§265.198 and 265.199. As required by §265.73, the owner or operator mut place the results from each waste analysis and trial test, or the documented information, in the operating record of the facility.]

§265.402 Waste analysis and trial tests*

In addition to the waste analysis required by §265.13, whenever:

> (1) A hazardous waste which is substantially different from waste previously treated in a treatment process or equipment at the facility is to be treated in that process or equipment, or
>
> (2) A substantially different process than any previously used at the facility is to be used to chemically treat hazardous waste;

the owner or operator must, before treating the different waste or using the different process or equipment:

> (1) Conduct waste analyses and trial treatment tests (e.g., bench scale or pilor plant scale tests); or
>
> (2) Obtain written, documented information on similar treatment of similar waste under similar operating conditions;

to show that this proposed treatment will meet all applicable requirements of §265.401(a) and (b).

[Comment: As required by §265.13, the waste analysis plan must include analyses needed to comply with §265 405 and §265.406. As required by §265.73, the owner or operator must place the results from each waste analysis and trial test, or the documented information, in the operating record of the facility.]

VII. Subject: Inspections

A. Summary of Proposed Standard 250.45-4(h):

The proposed standard required that basins be visually inspected in accordance with §250.43-6, and that any damage detected during the inspection be repaired immediately.

§250.43-6 called for the daily visual inspection of several specific components of hazardous waste facilities, plus the recording of these inspections in the facility's daily operating log. The daily inspection requirement could be relaxed for certain aspects of the facility's operation if the owner or operator could demonstrate that lesser requirements would still adequately protect human health and the environment.

B. Rationale for the Proposed Standard:

The purpose of the proposed §250.43-6 standards is discussed in the background document entitled "Inspections".

The purpose of the requirement that any damage detected during the visual inspection be repaired immediately, was to assure not only that damage to basins is detected, but that corrective measures are speedily taken to repair the damage.

C. Summary of Comments Received:

1. The requirement that basins be repaired "immediately", should be revised to require that damage be repaired:

   - as soon as practicable

- in time to prevent a substantial present or potential hazard to human health and the environment

because using the word "immediately" might subject owners/operators to penalties, even though they took prompt action in good faith. In addition, under certain circumstances (e.g., strikes, inclement weather, the need to remove the waste before repairing the basin), it may be impossible to carry out repairs immediately.

2. Daily inspection is unnecessary because dike failure is a long term event with early warning signs such as wet spots or dead or unusually lush vegetation in a limited area of the dike. Furthermore, the daily inspection aspect of the standard could be counterproductive because it could lead to superficial inspections.

3. The inspections required in items 1 through 7 of §250.43-4(a) are redundant for facilities regulated under OSHA's safe employment regulations, the Clean Water Act, the Clean Air Act, as well as state and local regulations.

D. Analysis of and Response to Comments:

1. The Agency agrees that it may not always be possible to "immediately" repair damage noted during the inspection of a facility. In some

cases, immediate repair, although desirable, may not be necessary. For example, the presence of rust in the wall of a tank should be remedied, but human health and the environment will not be placed in serious jeopardy, under most circumstances,. if the tank is not repaired for a week or two. Therefore, the final inspection standards require that any damage or adverse condition detected during the inspection must be corrected before it can result in a pollution incident. Where an incident is imminent or has already occurred, the final standards require that repair be made as soon as possible.

2. The response to comments concerning the daily inspection aspect of the proposed §250.43-6 standards is contained in the background document entitled "Inspections". The final general inspection standards (§250.15) require owners or operators to develop their own inspection schedule. The inspection schedule is to be based on the owner's or operator's knowledge of the facility's critical processes, equipment, and structures, and on his perception of the potential for failure and the rate of any deterioration processes (corrosion, erosion, etc.) which may lead to failure.

In addition, owners or operators of tanks must comply with certain minimum inspection requirements specified in the final standards for tanks. The rationale for including minimum inspection requirements in each of the technici sections of the final regulations, is contained in the background document entitled "Inspections".

The minimum inspection requirements for tanks and chemical, physical, and biological treatment facilities are divided into two categories: those aspects of the facility which require inspection each operating day, and those which require inspection each week.

Damage incident #3 on page 6 of this document illustrates that the spill control equipment of storage/treatment faicilities (e.g., a tank's valves) needs to be inspected each operating day because of the vital role (i.e., preventing the inflow to, or containing the overflow from containment devices) that such equipment plays at these facilities in preventing a malfunction which could quickly threaten human health or the environment. Similarly, the Agency believes that the data gathered from monitoring equipment (e.g., pressure and temperature guages) must be checked each operating day because of the important role that these data play in ensuring that the facility is running according to plan.

On the other hand, because deterioration resulting from corrosion or erosion normally occurs relatively slowly, the Agency believes that the construction materials of tanks and spill confinement structures (e.g., dikes) should only have to be inspected once a week. Weekly inspection should be adequate to detect corrosion or erosion long before the tanks or spill confinement structures are likely to fail.* The final standards also require weekly inspection of the grounds surrounding the tanks and spill confinement structures for obvious signs of leakage. Damage incident #4 illustrates the type of obvious signs of trouble (e.g., dead vegetation, visible air emissions) which signal the failure of a containment device.

3. Response to comments concerning the alleged overlap of the proposed §250 43-6 standards with the inspection requirements of other Acts, is contained in the background document entitled "Inspections".

---

* Support for a weekly inspection requirement for these aspects of facilities is contained in several of the comments received on the proposed §250.43-6 standards.

E. Final Regulation Language:

§265.194 Inspections

The owner or operator of a tank must inspect, where present:

(1) Discharge control equipment (e.g., waste feed cut-off systems, by-pass systems, and drainage systems), at least once each operating day, to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges), at least once each operating day, to ensure that the tank is being operating according to its design;

(3) The level of waste in the tank, at least once each operating day, to ensure compliance with §265.192(c);

(4) The construction materials of the tank, at least weekly, to detect corrosion or leaking of fixtures or seams; and

(5) The construction materials of, and the area immediately surrounding, discharge confinement structures (e.g., dikes), at least weekly, to detect erosion or obvious signs of leakage (e.g., wet spots or dead vegetation).

[Comment: As required by §265.15(c), the owner or operator must remedy any deterioratoin or malfunction he finds.]

§265.403 Inspections

The owner or operator of a treatment facility must inspect, where present:

(1) Discharge control and safety equipment (e.g., waste feed cut-off systems, by-pass systems, drainage systems, and pressure relief systems) at least once each operating day, to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges), at least once each operating day, to ensure that the treatment process or equipment is being operated according to its design;

(3) The construction materials of the treatment process or equipment, at least weekly, to detect corrosion or leaking of fixtures or seams; and

(4) The construction materials of, and the area immediately surrounding, discharge confinement structures (e.g., dikes), at least weekly, to detect erosion or obvious signs of leakage (e.g., wet spots or dead vegetation).

[Comment: As required by §265.15(c), the owner or operator must remedy any deterioration or malfunction he finds.]

VIII. Subject: Closure

A. Summary of Proposed Standards 250.45-4(h) and 250.45-6(h) and (i):

The proposed standards required that when a basin closes, all hazardous waste and hazardous waste residues contained in the facility must be removed from it and disposed of (250.45-4(h)), or treated or disposed of (250.45-6(h) and (i)), as a hazardous waste.

In addition, when removing residues from a treatment facility (either when the facility closes, or when simply cleaning the facility), the proposed standards required that the residues must be assumed to be hazardous unless they are analyzed and found not to be hazardous, within the meaning of the proposed Section 3001 regulations. However, testing to prove that a residue is non-hazardous was not required where the owner or operator could demonstrate that the residue is similar to a non-hazardous residue that was previously generated at the facility.

B. Rationale for the Proposed Standards:

Although it may be obvious that because basins and treatment facilities are temporary containment devices, the hazardous waste contained in them must be removed when the facility closes, it may not be as obvious that the hazardous waste residues that settle to the bottom of basins or treatment facilities must also be removed before closure. The Agency believed that hazardous waste residues must be removed from the facility because the structural material of the facility is eventually going to fail* (i.e., crack or corrode), and the subsequent discharge of the residue from the damaged facility may contaminate ground water or surface water. Damage incidents #2 and #6 on pages 5-6 of this document illustrate the type of damage which may result when hazardous waste is left in containment devices after the facility has closed.

Although some of the residues generated in treatment facilities (e.g., sludges which settle to the bottom of the containment device, or by-products generated during the treatment process itself) may have been rendered non-hazardous during the process of treating the waste, the Agency believes that most of the residues generated in treatment facilities are hazardous. Therefore, to discourage owners or operators from making hasty and perhaps erroneous assumptions about the nature of the residues which they generate, the Agency wrote the proposed standard to require that residues be treated or disposed of as hazardous waste unless they are proven to be non-hazardous.

---

* In fact, prolonged contact of the residue with the insides of the basin may even accelerate its deterioration if the residue is corrosive or incompatible with basin's structural materials.

C. Summary of Comments Received:

1. The requirement to remove all hazardous waste and hazardous waste residues from treatment facilities is inconsistent with §250.45-3(e)(1), which does not require removing the waste or residues of a surface impoundment which meets the landfill requirements of §250.45-2.

2. Residues should only have to be analyzed to determine whether they are hazardous if owners or operators have reason to believe that their residues are hazardous. This suggestion is consistent with page 58951 of the proposed Preamble, which states that such testing is only required when the generator has reason to believe that his waste is hazardous.

3. The requirement that the residue be analyzed to determine whether it is hazardous "within the meaning of Subpart A" is too broad, because Subpart A includes "the broad criteria of the stautory standard in §250.12 and the bases for listing in §250.14." The requirement for residue analysis should be consistent with the analysis required of generators of solid waste who know or who have reason to believe that their waste is hazardous. That is, the waste should be evaluated in accordance with the characteristics set forth in §250.13.

4. The 100 kg exemption for generators should apply to facility operators who generate residues through treatment.

D. Analysis of and Response to Comments:

1. The Agency did not intend that proposed §250 45-6(h) apply to surface impoundments closed in accordance with the landfill closure requirements. However, this intention was not reflected in the proposed standard. The final rules have been written to reflect the Agency's original intent.

2. The Agency believes that most residues resulting from treatment processes are hazardous wastes. For this reason, the final Part 261 rules specify that all such residues are hazardous unless the owner or operator can demonstrate otherwise. A more detailed explanation for this provision is contained in the Part 261 background document supporting the definition of hazardous waste in §261.3.

3. The Agency agrees that the proposed requirement to analyze the residue "within the meaning of Subpart A" was somewhat broad. The final rules specify that all residues generated from treatment processes are hazardous waste unless the owner or operator can demonstrate, in accordance with §261.3(c) or (d) of Part 261, that the residue is not a hazardous waste. As is further explained in the background document for

Part 261, this means that the residue need not be tested against a particular characteristic if no incoming waste was found hazardous under that characteristic, and that the residue need not be measured against the criteria for delisting a listed waste unless some incoming waste was a listed waste. The Agency does not agree that the residue should not be measured against the criteria for listing wastes so long as one of the incoming wastes was listed.

4. The final rules specify that, by removing a residue from a tank or treatment facility, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of the final Subtitle C rules. Any special exemptions pertaining to generators in these rules also apply to owners and operators generating residues.

F. Final Regulation Language:

§265.197 Closure

At closure, all hazardous waste and hazardous waste residues must be removed from tanks, discharge control equipment, and discharge confinement structures.

[Comment: At closure, as throughout the operating period, unless the onwer or operator can demonstrate, in accordance with §261.3(c) or (d) of this Chapter, that the residue removed from his tank is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this Chapter.]

§265.404 Closure

At closure, all hazardous waste and hazardous waste residues must be removed from treatment processes or equipment, discharge control equipment, and discharge confinement structures.

[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate, in accordance with §261.3(c) or (d) of this Chapter, that the residue removed from his treatment process or equipment is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this Chapter.]

IX. Subject: Special Requirements for Ignitable and Reactive Waste

A. Summary of Proposed Standard 250.45-4(b)(2) and (3):

The proposed standard prohibited owners or operators from placing ignitable or reactive waste in basins unless they could demonstrate that doing so would not:

- produce more air contaminants than the permissible exposure levels promulgated by OSHA, or
- damage the structural integrity of the basin through fires, explosive reactions, or the generation of heat.

B. Rationale for the Proposed Standard:

The Agency was concerned about owners or operators placing ignitable and reactive waste in containment devices because the waste may come in contact with materials with which it will ignite or react and thereby cause a fire or explosion, or generate excessive heat. Damage incident #1 on page 5 of this document exemplifies the types of dangers which can result from placing ignitable waste in containment devices.

Generating excessive heat or causing a fire or explosion in a containment device in which hazardous waste is treated or stored, poses a serious threat to human health and the environment because:

- it could generate hazardous air emissions which may endanger the health and lives of the facility's personnel and neighbors;
- it could damage the structural integrity of the basin through heat, fires, or explosive reactions. and allow hazardous waste to be discharged from the device to ground water or surface water;
- it could ignite nearby flammable waste.

To prevent this type of damage, the proposed standard restricted but did not prohibit the placement of ignitable or reactive waste in basins, since the Agency wished to encourage facilities to treat rather than dispose of hazardous waste. Conditions for a variance from the prosposed standard were included in the proposed rules, allowing owners or operators to place ingitable or reactive waste in basins is so doing would not (1) damage the structural integrity of the basin as a result of heat generation, fires, or explosive reactions; or (2) contribute air contaminants in excess of the permissible exposure levels promulgated by OSHA.

C. Summary of Comments Received:

1. The provision of the "Note" to the standard which required that owners or operators demonstrate that their treatment operations do not contribute air contaminants in excess of the permissible

exposure levels promulgated by OSHA is objectionable because this would:

- use RCRA to regulate air contaminants within the regulatory authority of the Clean Air Act and OSHA and, thus, would conflict with RCRA's Section1006 mandate regarding the application and integration of RCRA with other environmental laws.
- misuse the OSHA exposure limits which were derived from Threshhold Limit Values (TLVs) developed by the American Conference of Governmental Industrial Hygienists (ACGIH), because the ACGIH has placed the following restricitons on the use of the TLVs; the limits "are not intended for use, or for modification for use, (1) as a relative index of hazard or toxicity, (2) in the evaluation or control of community air pollution nuisances, (3) in estimating the toxic potential of continuous, uninterrupted exposures . . .".

Furthermore, the proposed use of OSHA limits is technically more stringent than the compliance requirements under OSHA itself. OSHA applies these limits to human exposure, and allows administrative controls and protective equipment for compliance.

Therefore, the restriction on placing ignitable and reactive waste in basins should be modified to allow placing such waste in basins for the purpose of treatment if such treatment will not:

- violate any applicable standards promulgated under the Clean Air Act; or
- damage the structural integrity of the basin through heat generation, fires, or explosive reactions.

D. Analysis of and Response to Comments:

1. The Agency agrees that the OSHA air contaminant exposure figures are not generally appropriate for the circumstances of waste treatment, storage, and disposal facilities, and they have been deleted from the regulations. In addition, the Agency is deferring promulgation of regulations dealing with volatile wastes under Section 3004, as explained in the preamble discussion entitled "Volatile Waste." Other standards for the treatment of ignitable, reactive, and incompatible wastes are discussed in the preamble.

2. The Agency still believes that certain restrictions are needed on placing ignitable or reactive waste in tanks and in chemical, physical, and biological treatment facilities. The final rules permit alternative approaches. An owner or operator may treat ignitable or reactive waste so as to render

the waste non-ignitable or non-reactive. This provision minimizes the potential for such waste to come into contact with sources of ignition, or with substances with which it may react, during the time the waste is contained in these facilities.

Alternatively, some owners or operators treat ignitable or reactive waste for a purpose other than rendering the waste non-ignitable or non-reactive, respectively -- e.g., to reduce the water content of the waste before incinerating it. Because the Agency wishes to encourage the treatment of hazardous waste, the final rules allow owners or oerators to treat or store ignitable or reactive waste without rendering the waste non-ignitable or non-reactive, respectively, if the waste is treated or stored in such a manner that it is protected from any sources of ignition or from any material or condition which may cause it to react.

Finally, the final rules permit placement of ignitable or reactive wastes in tanks which are used solely for emergencies. Petroleum refiners requested such an exemption for surface impoundments which collect petroleum and related material in emergencies. The Agency has made such a provision in the surface impoundment regulations, and believes that a parallel exemption for tanks is warranted.

The Agency has included in §265.17(b) of Subpart B of the final rules, general requirements for ignitable, reactive, and incompatible wastes. The final Subparts J and Q requirements specify that treatment or storage of ignitable and reactive waste in tanks and in chemical, physical, and biological treatment facilities must be done in accordance with §265.17(b). The rationale for the §265.17(b) requirements is contained in the preabmle discussion entitled "Ignitable, Reactive, and Incompatible Wastes".

The Agency believes that the potential for a violent explosion or fire from a tank containing ignitable or reactive waste is more likely to occur if the tank is covered because of the tendency for vapors to pressurize in enclosed devices. For this reason, the Agency believes that minimum setbacks from the facility's property line should be required for tanks which contain ignitable or reactive waste. This would minimize the potential for injury to the neighboring public from the flying debris or toxic air emissions which often result from exposions involving hazardous materials. For example, the explosion which occured in 1977 at the chemical disposal site in New Jersey (see damage incident #1 on page 5 of this document) resulted in the ejection of several large tanks and the death and injury of several people at the site.

Not a great deal of data is available on which the Agency can base minimum setback requirements for these types of waste. The only data on this subject of which EPA is aware is that gathered by the National Fire Protection Association (NFPA). This data was codified in the NFPA's Flammable and Combustible Code of 1977.

The purpose of the standards in the NFPA code is "to reduce the hazard to a degree consistent with reasonable public safety, without undue interference with public convenience and necessity which requires the use of flammable and combustible liquids"[33] (emphasis added). Because protection of human health from fires or explosions resulting from the storage of ignitable and reactive waste is also a goal of the Section 3004 RCRA rules, it is appropriate to use the NFPA's minimum setback requirements as the basis for establishing EPA's regulations for ignitable and reactive waste. Although EPA's categories of ignitable and reactive waste are only roughly comparable to NFPA's category of flammable and combustible liquids, the setback requirements in the NFPA rules would appear to represent a minimum for all ignitable and reactive wastes, since the great majority of these wastes pose similar hazards from ignition or reaction. Therefore, the final rules require that the treatment or storage of ignitable or reactive waste must be in accordance with the NFPA's buffer zone requirements for tanks, contained in Tables 2-1 of the "Flammable and Combustible Code of 1977". These tables are contained in Appendix I of this document.

These NFPA standards already apply to most covered tanks containing ignitable and reactive materials under the Occupational Safety and Health Administrations's (OSHA) regulations. The Agency, therefore, does not expect these regulations to necessitate substantial capital expenditures for covered tanks.

The NFPA standards do not by their terms apply to uncovered tanks and, thus, requiring these existing tanks to comply with the NFPA standards might require substantial capital expenditures. Because such a requirement does not meet the general criteria for interim status standards (see the Foreward to this document), it has not been included in the Part 265 rules. For this same reason, the requirement to comply with the NFPA standards has also not been included in the Subpart Q standards for chemical, physical, and biological treatment facilities.

E. Final Regulation Language

§265.192 General operating requirements*

(a) Treatment or storage of hazardous waste in tanks must comply with §265.17(b).*

§265.198 Special requirements for ignitable or reactive waste [Interim Final]

(a) Ignitable or reactive waste must not be placed in a tank, unless:

(1) The waste is treated, rendered, or mixed before or immdediately after palcement in the tank so that (i) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under §§261.21 or 261.23 of this Chapter, and (ii) §265.17(b) is complied with; or

(2) The waste is stored or treated in such a way that it is protected from any material or conditions which may cause the waste to ignite or reacte; or

(3) The tank is used solely for emergencies.

---

* §265.17 General requirements for ignitable, reactive, or incompatible wastes [Interim Final]

(b) Where specifically required by other Sections of this Part, the treatment, storage, or disposal of ignitable or reactive waste, and the mixture or commingling of incompatible wastes, or incompatible wastes and materials, must be conducted so that it does not:

(1) Generate extreme heat or pressure, fire or explosion, or violent reaction;

(2) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health;

(3) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire of explosions;

(4) Damage the structural integrity of the device or facility containing the waste; or

(5) Through other like means threaten human health or the environment.

(b) The owner or operator of a facility which treats or stores ignitable or reactive waste in covered tanks must comply with the National Fire Protection Association's (NFPA's) buffer zone requirements for tanks, contained in Talbes 2-1 through 2-6 of the "Flammable and Combustible Code - 1977".

[Comment: See §265.17(a) for additional requirements.]

§265.401 General operating requirements*

(a) Chemical, physical or biological treatment of hazardous waste must comply with §265.17(b).

§265.405 Special requirements for ignitable or reactive waste [Interim Final]

(a) Ignitable or reactive waste must not be placed in a treatment process or equipment unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the treatment process or equipment so that (i) the resulting waste, mixtrue, or dissolution of material no longer meets the definition of ignitable or reactive waste under §§261.21 or 261.23 of this Chapter, and (ii) §265.17(b) is complied with; or

(2) The waste is treated in such a way that it is protected from any material or conditions which may cause the waste to ignite or react.

X. Subject: Special Requirements for Incompatible Waste

A. Summary of Proposed Standards 250.45-4(c) and 250.44(i):

The proposed standards prohibited placing hazardous wastes which are incompatible with each other in basins.

The standards also prohibited placing hazardous waste in an unwashed storage tank that previously held an incompatible material.

B. Rationale for the Proposed Standards:

The Agency was concerned about owners or operators placing wastes which are incompatible in the same containment device because the commingling of incompatible waste may:

(1) Generate hazardous air emissions which may endanger the health and lives of the facility's personnel and neighbors. For example, mixing cyanide or sulfide-containing wastes with acidic solutions may release toxic HCN H_2S vapors into the environment.

(2) Generate excessive heat, fire, or explosions, which may damage the structural integrity of the containment device and, thus, possibly cause hazardous waste to be discharged from the basin to ground water or surface water. For example, mixing hazardous waste containing highly reactive components (e.g., oxidation-reduction agents and organics) may generate excessive heat which could adversely affect the impermeability of some construction materials or liners.

C. Summary of Comments:

1. The prohibition on mixing incompatible waste precludes the presently desirable waste management practice of controlled neutralization of spent acids and caustics. The standard should be revised to allow wastes which are incompatible to be mixed, if such mixing is:

- for the purpose of treatment
- in accordance with the provisions of the note to §250.45(c)

2. The requirement that hazardous waste must not be placed in a storage tank or container which previously held an incompatible waste is unnecessary, particularly when:

- the tank is empty, or
- the tank is suitable for both caustic and acidic substances

D. Analysis of and Response to Comments:

1. The Agency agrees that incompatible wastes should be allowed to be mixed together in containment devices for the purpose of treatment if the §265.17(b) regulations are complied with (see previous Section of this document).

As mentioned earlier, the Agency is deferring regulation of volatile wastes, which may cause air emissions to be generated from treatment facilities.

The only restriction included in the final interim status standards on the treatment of incompatible wastes in facilities subject to control under Subparts J and Q, is that this treatment comply with §265.17(b).

2. The Agency believes that placing hazardous waste in containment devices which previously held an incompatible waste should be restricted even when the device is "empty," because the residues that are left in the device may react adversely with the "new" waste to be stored or treated in the device. Damage incident #5 on page 6 of this document exemplifies the type of potential hazards associated with placing waste in an unwashed containment device which previously held an incompatible waste. This hazard exists even if the tank itself is compatible with both the previous waste and the "new" waste.

The Agency believes that, unless devices are cleaned (washed), they are seldom empty because the pumps and drain valves used for this purpose are seldom capable of removing the last drops of waste which settle to the bottom, or adhere to the sides of the tank. Therefore, the requirement to wash a tank before emplacing a "new" waste in it,--if the "new" waste is incompatible with the "original" waste--has been retained in the final standards. However, the standard has been reworded to allow waste to be placed in an unwashed device which previously held an incompatible waste, if it is done in accordance with §265.17(b).

E. Final Regulation Language:

§265.199 Special requirements for incompatible waste

(a) Incompatible wastes or incompatible wastes and materials (see Appendix V for examples), must not be placed in the same tank unless §265.17(b) is complied with.

(b) Hazardous waste must not be placed in an unwashed tank which previously held an incompatible waste or material, unless §265.17(b) is complied with.

§265.406 Special requirements for incompatible wastes

(a) Incompatible wastes, or incompatible wastes and materials (see Appendix V for examples), must not be placed in the same treatment process or equipment, unless §265.17(b) is complied with.

(b) Hazardous waste must not be placed in unwashed treatment equipment which previously held an incompatible waste or material, unless §265.17(b) is complied with.

XI. Subject: NPDES Facilities

A. Summary of Comments:

NPDES-permitted treatment facilities should be exempt from the §250.45-6 standards, because:

1. These facilities are regulated under Section 402 of the Clean Water Act, and Section 1006 of RCRA specifically excludes activities or substances subject to the Clean Water Act from regulation under RCRA.

2. The terms of the NPDES permit overlap and are inconsistent with the provisions of §250.45-6. For example, §250.45-6(g), which requires by-passing, is incompatible with certain industry NPDES requirements which prohibit by-passing.

3. The standards dictate design and operating procedures which are outside of the RCRA mandate for such facilities.

B. Analysis of and Response to Comments:

1-2. Section 1006 of RCRA exlcudes activities or substances subject to the Clean Water Act (CWA) "except to the extent that such application (or regulation) is not inconsistent with the requirements" of the CWA. As stated earlier, the Agency believes it has authority under RCRA to regulate NPDES facilities. The Agency is also unaware of any regulations promulgated under the CWA which are inconsistent with the proposed §250.45-6 standards. With regard to the example cited by the commenters concerning by-pass systems, proposed §250.45-6(g) gave, and present §265.192(d) gives, owners or operators the option of either equipping their treatment systems with an automatic waste feed cut-off or a by-pass system. Thus, in those instances where the provisions of a facility's NPDES permit prohibit by-passing, owners or operators are able to comply with the proposed standard by installing an automatic waste feed cut-off system at their facilities.

3. As explained on pages 17-18 of this document, the Agency believes that the standards it has proposed for treatment facilities are in accordance with the authority given to the Agency in Section 3004 of RCRA. Thus, where NPDES-permitted facilities contain hazardous waste, the Agency believes that these facilities should comply with the standards promulgated under Section 3004 of RCRA, as well as those promulgated under the CWA. Response to this comment is also contained in the preamble to the Section 3001 standards. In addition, the proposed and present interim status standards contain few of the design standards proposed for the general status standards. Comments directed toward the

general standard design requirements will be discussed when general design standards are promulgated.

XII. Subject: Miscellaneous Comments

Comment: It is unreasonable to require facilities which change the pH of their wastes, so as to render them less hazardous before disposal, to comply with the requirements for treatment facilities. This points out the need for separate standards for on-site treatment and storage facilities.

Response: The definition of "treatment", in Section 1004 of RCRA, specifically includes neutralization processes. Because the regulation of pH is a "neutralization process", the Agency's regulations which pertain to treatment facilities must apply to all facilities which change the pH of their waste.

Because facilities which neutralize their waste on-site pose an equal potential threat to human health and the environment as do off-site neutralization processes,* the Agency disagrees with the commenter's suggestion that separate sets of standards should be written for on-site facilities at which hazardous waste is neutralized.

Comment: The standards for treatment facilities (§250.45-6) are too detailed because they impose requirements on semi-hazardous materials which will have little or no effect upon water quality or public health. The standards for treatment facilities should be related to the degree of hazard of the waste being treated.

---

* Except for totally enclosed treatment facilities, which have been exempted from the Subtitle C rules (see page 19 of this document).

Response: The Agency disagrees with the commenter's suggestion that the proposed standards for treatment facilities are too detailed. On the contrary, the Agency recognized that it is difficult to write specific design and operating standards which would be appropriate for all treatment systems and, therefore, wrote performance-oriented standards in the proposed §250.45-6 rules for chemical, physical, and biological treatment facilities. The Agency believes that all of these proposed standards are appropriate for all hazardous waste treatment facilities, regardless of the hazard of the waste being treated. (See the background document entitled "Degree of Hazard" for the Agency's rationale for not establishing regulations based on the degree of hazard of the waste.)

Chapter 4

ANALYSIS OF GENERAL STANDARDS FOR TANKS

Organized by Subject

Introduction

In December 1978, EPA proposed rules for storage of hazardous waste in tanks. In May 1980, EPA promulgated interim status regulations for treatment and storage of hazardous waste in tanks (Part 265, Subpart J). The rationale for the requirements promulgated in May is contained in the previous chapter entitled "Analysis of the Interim Status Standards."

To a large extent the interim status standards for tanks have been incorporated in the general (permit) standards discussed in this Chapter. The rationale for the inclusion of these requirements in the general standards is the same as the rationale for their inclusion as interim status requirements. However, in May 1980, comments were requested on several of the interim status requirements. In response to these comments, the Agency has revised the wording of these requirements in the Part 264 general standards. The Agency intends to make similar revisions to the interim status standards for tanks at a future date.

Two requirements have been included in the general standards for tanks which were not promulgated as interim status standards in May. The requirement pertaining to "design of tanks" (§264.191) was not amenable to interim status since an active review of the tank design by EPA is necessary to implement the requirement. A new inspection requirement (§264.194(b)) has also been included in the general standards. A similar requirement (§265.194(b)) is being proposed for addition to the interim status standards.

The remainder of this chapter discusses the rationale for each requirement in the order that they appear in the Part 264, Subpart J stadnards. In cases where a similar interim status rule exists, the rationale for that requirement provided in Chapter 3 is referenced, and any comments received on that requirement are addressed.

I. Applicability

A. Rationale

For a discussion of the definition of "tank" and of the applicability of the interim status rules ses Section I of Chapter 3 (p. 22).

The general standards for tanks (Part 264, Subpart J) apply only to tanks whcih are partially above-ground or are accessible from the surface. Covered underground tanks which cannot be entered for inspection have been excluded.

The Agency's rationale for not allowing the permitting of underground tanks under the current Part 264, Subpart J requirements is that the crucial elements of the Agency's strategy for regulating tanks are not applicable to covered, underground tanks which are inaccessible from the surface. The Agency's standards for tanks currently include requirements for (1) proper design and operation for primary containment and (2) inspections to insure the integrity of primary containment. The Agency does not, at this time, know of any means to adequately inspect and insure the intergrity of an underground tank that cannot be entered for inspection. As illustrated by damage cases 12, 19 and 20 underground tanks are subject to leaks due to undetected deterioration or faults in design.

The Agency has proposed the option of banning the use of underground tanks to treat or store hazardous waste. The Agency has requested that commenters opposing the ban provide information on means of inspecting and insuring the integrity of an underground tank. In response to these comments the Agency may either: (1) propose a ban or the use of underground tanks or (2) propose additions to Subpart J which would apply to underground tanks.

B. Final Language

§264.190 Applicability

(a) The regulations in this Subpart apply to owners and operators of facilities that use tanks to treat or store hazardous waste, except as §264.1 and paragraph (b) of this Section provide otherwise;

(b) The regulations in this Subpart do not apply to facilities that treat or store hazardous waste in covered underground tanks that cannot be entered for inspection.

II. Design of Tanks

A. Summary of the Proposed Regulation - §250.44(g)

Storage tanks were required to be of sturdy and leak-proof construction in accordance with the Occupational Safety and Health Administration's (OSHA) regulations for storage of flammable and combustible liquids (29 CFR Part 1910, §1910.106).

B. Rationale for the Proposed Standard

Because the proposed requirements specified that storage be conducted so that "no discharge of hazardous waste occurs" (§250.44(b)), storage tanks were required to be of "leak-proof" construction.

OSHA has written safety standards for storage of flammable and combustible waste in tanks. These standards were deemed to be adequate to ensure that tanks were sturdy and leak-proof.

C. Summary of Comments

(1) OSHA requirements are not appropriate to tanks containing hazadous wastes which are not ignitable or reactive.

(2) The requirement is unreasonably burdensome in that it restricts owners and operators to the use of design specifications specified in the OSHA standard. OSHA is in the process of eliminating these design requirements as unnecessary for the task of protecting worker safety.

D. Response

(1) No discharge rationale for proposed rule

In response to comments received on the proposed "no discharge" performance standard (§250.44(b)), the Agency has eliminated that requirement. (See discussion of "No Discharge" in Part III of the Background Document on Standards for Piles and Containers) while the Agency continues to believe that storage of hazardous waste should have the goal of complete containment, EPA is now of the opinion the requirements stipulating "no discharge" or "leak-proof construction" are unreasonable. Therefore, the proposed standard for sturdy, leak-proof construction has been replaced by the §264.191 requirement that the design of the tank be reviewed by the Regional Administrator and that tanks be maintained at a minimum shell thickness to assure sufficient shell strength.

(2) Three part strategy for storage

The final requirement is a component of a three part approach to minimizing and containing tank failures. The components of this approach are:

(1) Proper design of tanks to prevent rupture or collapse;

(2) Inspections and testing are required for the detection of leaks and weaknesses; and

(3) Secondary containment for those spills and failures which do occur (to be proposed).

As illustrated in damage cases 9, 11, and 18, tanks are prone to leaks, ruptures and collopse due to changes in internal pressure, settling of the foundation, or corrosion or erosion of the tank walls or structural support. Therefore, it is crucial that a tank be designed in a manner which maximizes its strength and durability.

Initial design requirements alone are not sufficient to ensure the continuing structural integrity of the tank. Shell thickness and strength can be substantially reduced by corrosion or abrasion. If a minimum shell thickness is not maintained, leaks and ruptures due to wall thinning are inevitable. Therefore, the Agency has required that a tank continue to meet a specification for minimum shell thickness.

In the preamble to these rules three options for maintining shell thickness are suggested. They are:

(1) Design the tank with shell thickness in excess of that specified by the Regional Administrator and monitor any wall thinning to ensure that the original margin for corrosion is not exceeded, (i.e. over-design the tank),

(2) Line, coat or otherwise protect the tank in a manner which would prevent wall thinning due to corosion, or

(3) Place only those wastes or materials in the tank which will not corrode or abrade the walls of the tank.

However, regardless of the option chosen by the owner or operator, periodic inspections are required under §264.194(b) to verify compliance with the §264.191 minimum thickness requirement.

The large majority of industrial plants use one of these three options to protect their equipment. See the National Association of Corrosion Engineers publication "Direct Calculation of Economic Appraisals of Corrosion Control Measures"[34] for a discussion of the economics of corrosion control. In some cases, industrial plant operators have found it to be cost effective to allow equipment to deteriorate until breakdown. EPA does not believe this practice of knowingly inviting equipment failures is acceptable for structures used to treat or store hazardous waste. Structures used for this purpose should be closed before they deteriorte to an unusable condition. A requirement for maintaining a minimum shell thickness is the clearest and most effective means of implementing this intent for storage and treatment tanks.

EPA intends that the minimum thickness requirement apply to tanks constructed of all typs of materials (e.g., steel, concrete, or plastic). Concrete tanks are subject to deterioration when exposed to chemicals such as alum, chlorine, sodium hydroxide or sulfuric acid.[35] (While often referred to as corrosion, the term is not strictly appropriate to concrete deterioration.) Erosion and abrasion also affect concrete. Concrete can be protected from potentially damaging chemicals through the use coal tar base paint, apoxy coatings, bituminous coatings, or plastic or rubber lining.[35] EPA realizes that a loss of thickness which would be of considerable concern in a steel tank (e.g. 0.1 inch loss) would often not even be detectable in a concrete tank. In general, EPA believes that a loss of tank shell thickness in excess of 10% below the minimum established thickness should be detectable and warrants immediate repairs or removal of the tank from service. However, the precision with which losses of tank shell thickness can be measured will be determined by the procedures used for inspection as described in the inspection schedule. For a discussion of inspections see section V of this chapter.

3. Design Standards

The proposed requirement stated that tanks should meet the Occupational Safety and Health Administration's regulations for storage of flammable and combustible liquids (29 CFR §1910.106). The OSHA standard referenced several design specifications prepared by the American Petroleum Institute and Underwriter's Laboratories Inc. The Agency has decided that a direct reference to industrial design standards is more clear and defensible than a reference to OSHA requirement.

In response to the commenter questioning OSHA's use of design standards, it should be noted that EPA's mandate differs substantially from OSHA's. Section 3004 of RCRA clearly states that storage means containment of the waste. EPA is using design standards as a means of ensuring containment. Whether OSHA has exceeded its mandate in specifying design standards is immaterial to this discussion.

The §264.191 requirement stipulates that the Regional Administrator shall use the industrial design standard and other available information provided by the owner or operator in his permit application as the basis for evaluating tank design.

Design standards are published by the American Petroleum Institute (API), Underwriter's Laboratories (UL), the American

Society of Mechanical Engineers (ASME), the American Water Works Association (AWWA), and the American Concrete Institute (ACI). The following standards are the most commonly used in design of industrial tanks:

(1) API Standard 650 - atmospheric tanks[36]

(2) API Standard 620 - low pressure tanks[37]

(3) AWWA Code D100 - water storage tanks[38]

(4) ASME pressure vessel code V - high pressure tanks[39]

(5) UL No 142 - tanks for flammable and combustible liquids[40]

(6) ACI-350R-77 - Concrete sanitary engineering structures[41]

Design standards normally specify either a minimum thickness for the tank or an equation or model for determining minimum thickness. In addition the standards address such factors a pressure controls, foundations and structural support and procedures for designing and ensuring the tightness of seams.

The §264.191 requirement also states that the Regional Administrator shall consider the width, height, and materials of construction of the tank, and the specific gravity of the waste which will be placed in the tank. These factors are dealt with in most design standards but have been included in the regulation language to clarify the procedures to be used by the Regional Administrator in establishing the minimum thickness.

The "Permit Writers' Guidance Manual on Tanks" contains additional information on tank design and provides examples of how minimum thickness is determined based on the factors specified in the regulation.[42] Information on corrosion is provided in the "Incompatibility Guidance Manual."[43]

E. Final Language

§264.191 Design of tanks

(a) Tanks must have sufficient shell strength and, for closed tanks, pressure controls (e.g., vents) to assure that they do not collapse or rupture. The Regional Administrator will review the design of the tanks, including the foundation, structural support, seams and pressure controls. The Regional Administrator shall require that a minimum shell of thickness be maintained at all times to assure sufficient shell strength. Factors to be considered in establishing minimum thickness include the width, height and materials of construction of the tank and the specific gravity of the waste placed in the tank. In reviewing the design of the tank and establishing a minimum thickness, the Regional Administrator shall rely upon appropriate industrial design standards and other available information. [Comment: Design standards for certain types of tanks are published by the American Petroleum Institute, Underwriter's Laboratories, the American Concrete Institute, and several other organizations.]

III. Compatibility of Waste with Containment Device

A. Summary of the Requirement - §265.192(b)

The interim status standard promulgated May 19, 1980, required that wastes or treatment reagents not be placed in a tank if they could cause the tank to rupture, leak, corrode or otherwise fail before the end of its intended life.

Comments were requested as to the propriety of including this requirement in the interim status standards.

B. Rationale for Inclusion as Interim Status Standard

The standard was intended to prevent the rapid deteriortion of a tank by controlling the types of waste placed in the tank.

A complete discussion of the rationale for inclusion of the requirement is contained in Part III of Chapter 3 (p. 33).

C. Summary of Comments

Commenters stated that some corrosion was expected in normal use, and therefore the language should be changed to require that wastes be treated in adequately designed and constructed equipment.

D. Response

The Agency agrees with the commenter that the regulatory language should allow for gradual corrosion. Since the Agency has been unable to establish a clear demarcation between gradual and excessive corrosion, the term incompatible has been choosen to express the Agency's intent that only highly corrosive reactions (e.g., sulfuric acid on carbon steel) need be avoided. The Agency has restructured the requirement, removing the words "before the end of its intended life" since the meaning of these words was unclear given that tank lifetimes are rarely predictable. The revised requirement more clearly expresses the Agency's intent that the tank must be protected from incompatible wastes and materials.

The reference to cathodic protection in 265.192(a)(2) refers to the use of cathodic protection to prevent corrosive reactions between the tank and the contents. In the preamble to the regulations, the option of requiring cathodic protection for partially-buried tanks is discussed. The intent of such a requirement would be to prevent corrosive reactions between the tank and surrounding soil.

E. Final Language

§264.192 General operating requirements

(a) Wastes and other materials (e.g., treatment reagents) which are incompatible with the material of construction of the tank must not be placed in the tank unless the tank is protected from accelerated corrosion, erosion or abrasion through the use of:

(1) An inner liner or coating which is compatible with the waste or material and which is free of leaks, cracks, holes or other deterioration; or

(2) Alternative means of protection (e.g., cathodic protection or corrosion inhibitors).

IV. Freeboard and Overfilling Controls

A. Summary of the Interim Status Requirements - §265.192(c) and (d).

The interim status standard for freeboard (§265.192(c)) stipulated that uncovered tanks be operated to ensure at least 60 centimeters (2 feet) of freeboard unless the tank is equipped with a containment structure, drainage control system or diversion structure with equivalent capacity.

The interim status standard for controls on inflow into the tank (§265.192(d)) required that tanks with continuous feed be equipped with a means to stop inflow.

Comments were requested on the propriety of including these requirements in th interim status standards.

B. Rationale for Inclusion as Interim Status Standard

Since secondary containment or drainage control systems are not required, the freeboard requirement was necessary to prevent spills over the rim of the contianment device due to:

- acceleration of the flow rate into the tank past that for which it is designed,
- wave-action, or
- major precipitation.

See Section V of the "Analysis of the Interim Status Standards" for a more complete discussion of the rationale behind the freeboard requirement.

The requirement for inflow controls was intended to prevent the overfilling of a tank due to a system failure and to stop inflow to the tank in the event of a leak. Damage case 17 illustrates the type incidents which can occur if inadequate overfilling controls are provided. The Agency stated that inflow should be prevented from entering the tank rather than relying on confinement structures to contain the overflow. See section IV of the "Analysis of the Interim Status Standards" (p. 39) for a more complete discussion of the rationale for the inflow control requirement.

C. Summary of Comments

Comments stated that the freeboard requirement was too inflexible and should be replaced by a more flexible performance stadnard or deleted. The example of clarifiers with overflow weirs that prevent the waste level from rising above the weir level was often repeated as a situation where the requirement is inappropriate.

D. Response

The Agency agrees that the two foot freeboard requirement was too inflexible. While 2 feet of freeboard is usually much more than is needed to protect against overtopping due to wind or wave action or major precipitation, it would probably be ineffective in preventing overfilling due to an acceleration of the flow rate into the tank. In addition, the Agency believes that containment or drainage structures surrounding the tank are not an acceptable means of dealing with overtopping due to wave or wind action or precipitation since there is a high probability of loss of waste after the waste overtops the tank.

The requirement now begins by stating the general goal which is to prevent overfilling. Follwing the statement of purpose the requirement stipulates that controls to prevent overfilling, such as waste feed cut-off or by-pass systems, must be provided. overflow weirs to a tank or impoundment are acceptable controls on overfilling. In uncovered tanks, sufficient freeboard must be maintained to prevent overtopping due to wave and wind action or precipitation.

It should be noted that the requirement for controls to prevent overfilling applies to all tanks, not just tanks with continuous feed.

E. Final Language

(b) The owner or operator must use appropriate controls and practices to prevent overfilling. These must include:

(1) Controls to prevent overfilling (e.g., waste feed cutoff system or by-pass system to a standby tank); and

(2) For uncovered tanks, maintenance of sufficient freeboard to prevent overtopping by wave or wind action or by precipitation.

V. Waste Analysis and Trial Tests

A. Summary of the Requirement - §265.193

In addition to the waste analysis required by §265.13, whenever a tank is to be used to treat or store a waste substantially different from wastes previously treated or stored or to treat a waste using a new treatment process the owner or operator is required to conduct waste analysis and trial treatment or storage tests or obtain written documented evidence of similar storage or treatment of similar waste.

Comments were requested as to the propriety of including the waste analysis and trial test requirement in the interim status standards.

B. Rationale for Inclusion as an Interim Status Standard

The requirement ensures that owners or operators have reliable information on the safety and effectiveness of any new treatment or storage technique. See Section VI of the "Analysis of the Interim Status Standards" for a more complete discussion of the trial test requirement.

C. Summary of Comments

Commenters stated that the requirement is too detailed for an Interim Status Standard and is redundant with the §265.13 - General Waste Analysis requirements.

Commenters suggested that the requirement be amended to allow the owner or operator to use sound engineering judgment as the basis for his decision to treat or store a different waste or use a different treatment process.

D. Response

The Agency disagrees that engineering judgement alone is sufficient as the basis for treating or storing a different waste or using a different treatment process. EPA has concluded, however, that detailed waste analysis could provide enough information, to make trial tests unnecessary in some cases. Therefore, the Agency has not included the waste analysis and trial test requirement in the Part 264 standards.

A requirement has been included in §264.17 which states that when treating, storing or disposing of ignitable, reactive or incompatible wastes, the owner or operator must perform such waste anlyses or trial tests as are necessary to insure compliance with that Section. In addition, §264.13 requires that the owner or operator conduct sufficient waste analyses to obtain all information needed to comply with the requirements of Part 264. Comments have been added to §§264.198 and 264.199 to remind the reader of the §264.13 and 264.17 requirements.

VI. Inspections (§264.194)

A. Proposed Rule, Comments and Interim Status Rule

See Section VII of the "Analysis of the Interim Status Standards" (p. 53) and the seperate background document entitled "Inspections" for a discussion of the proposed regulations, comments received on these regulations, and the interim status requirements.

B. Rational for General Standard for Tank Inspections (§264.194)

Paragraph (a) of the general stanard for inspection (§264.194) is nearly identical to the interim status standard for tank inspections (§265.194). Minor changes have been made to reflect differences between the operating requirements in Part 264 (§264.192) and those promulgated on May 19, 1980 in Part 265 (§265.192). These differences are discussed in the preamble to Part 264.

In addition to the paragraph (a) requirements, a new inspection requirement has been included in §264.194. The new requirement calls for periodic assessments of the condition of the tank. The owner or operator is to include a schedule and procedures for these inspections as part of his inspection schedule required under §264.15(b). The schedule and procedure must be adequate to detect cracks, leaks or wall thinning. The requirement stipulates that if necessary, procedures for emptying the tank to allow entry must be established. The frequency of these inspections must be based on the material of construction of the tank, type of corrosion or erosion protection used, rate of corrosion or erosion observed during previous inspections, and the characteristics of the waste being treated or stored since these factors determine the rate of possible deterioration.

The comprehensive inspections are necessary to ensure compliance with §264.191 requirements for minimum thickness of the tank shell and to detect cracks and leaks not noticeable from the exterior. Damage cases 9, 11, and 18 in the "Introduction and Rationale" section of this document are examples of situations where deteriorated tanks contributed to the contamination of surface and ground waters.

While no method for assessing the condition of a tank can accurately determine whether it will or will not fail, several factors can be used to estimate the general extent and rate of actual deterioration. These factors are:

(1) thickness and strength of material at likely weak spots, whether corrosion has caused substantial decrease in the thickness of the structural material,

(2) extent of corrosion as determined through inspecting both the inner and outer surfaces of the tank, and

(3) extent to which minor failures have occurred which indicated general deterioration of the tank.

While the procedures to be used in the inspection will be specified by the owner or operator and approved by the Regional Administrator as part of the inspection schedule some useful components of such an inspection are specified below:

(1) empty the tank;

(2) vent remaining vapors in a environmentally sound manner;

(3) test quality of air within tank to determine whether: (1) additional venting (2) addition of a non-reactive atmosphere (helium), or (3) life support systems, will be necessary;

(4) visually inspect the interior of the tank;

(5) measure wall thickness at representative points using ultrasonic device or in concrete take examine visually for eroded areas; and

(6) Hammer (or use ultrasonic device) on walls and tank bottom to detect flaws.

EPA believes that in the large majority of cases entry into the tank is necessary to conduct a thorough inspection. However, viewing and testing the interior from an access door or port would usually be acceptable for small tanks (i.e., less the 1,000 gallons). The owner or operator may specify procedures for inspection not involving entry for larger tanks. The Regional Administrator would determine whether such procedures are adequate to detect cracks, leaks, corrosion which may lead to cracks or leaks, or wall thinning to less than the thickness required under §264.191.

The paragraph (c) requirement stipulates that the owner or operator specify in the contingency plan required under Subpart D of Part 264, response procedures for tank leaks and spills. The paragraph (c) requirement is necessary to assure that owners and operators are prepared and able to respond to tank spills and leakage in a manner which will minimize environmental damage.

A comment has been added to §264.194 to remind the owner or operator that §264.15(c) requires the repair of all malfunctions, leaks or deficiencies located during an inspection. The comment also reminds the reader of requirements published by the Occupational Safety and Health Administration relating to entry of tanks.

Additional information on tank inspections is provided in the "Permit Writers' Guidance Manual on Tanks."[44]

E. Final Language

§164.194 Inspections

(a) The owner or operator must inspect:

(1) Overfilling control equipment (e.g., waste feed cut-off systems and by-pass systems) at least once each operating day to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges) where present, at least once each operating day to ensure that the tank is being operated according to its design;

(3) For uncovered tanks, the level of waste in the tank, at least once each operating day, to ensure compliance with §264.192(b)(2);

(4) The construction materials of the above-ground portions of the tank, at least weekly to detect corrosion or

erosion and leaking of fixtures and seams; and

(5) The area immediately surrounding the tank, at least weekly, to detect obvious signs of leakage (e.g., wet spots or dead vegetation).

(b) As part of the inspections schedule required in §264.15(b) and in addition to the specific requirements of paragraph (a) of this Section, the owner or operator must develop a schedule and procedure for assessing the condition of the tank. The schedule and procedure must be adequate to detect cracks, leaks, corrosion or erosion which may lead to cracks or leaks, or wall thinning to less than the thickness required under §264.191. Procedures for emptying a tank to allow entry and inspection of the interior must be established when necessary to detect corrosion or erosion of the tank sides and bottom. The frequency of these assesments must be based on the material of construction of the tank, type of corrosion or erosion protection used, rate of corrosion or erosion observed during previous inspections, and the characteristics of the waste being treated or stored.

(c) As part of the contingency plan required under Subpart D of Part 264, the owner or operator must specify the procedures he intends to use to respond to tank spills or leakage, including procedures and timing for expeditious removal of leaked or spilled waste and repair of the tank.

[Comment: As required in §264.15(c), the owner or operator must remedy any leak, crack, or wall thinning in violation of §264.191 or equipment or process malfunction in violation of

§264.192 which he discovers during inspection. See 29 CFR §1910.94 (d)(ii) for Occupational Safety and Health Administration requirements relating to entry of tanks for inspection.]

VII. Closure

A. Summary of the Interim Status Requirement - §265.197

The interim status requirement stated that all hazardous waste and hazardous waste residues must be removed from tanks, discharge control equipment and discharge confinement structures.

B. Rationale for Interim Status Standard

Since the Subpart G closure requirements require removal of waste and decontamination of the facility, the tank closure requirement served mainly as a reminder that waste the requirement for removal of waste includes waste residues and that discharge confinement structes which have been contaminated through spills must be cleaned.

A complete discussion of the rationale for this standard is contained in Section VIII of Chapter 3 (p. 60).

C. Inclusion in General Standards

A requirement identical to the interim status standard for closure of tanks has been included in the General Standards (§264.197). The rationale for its inclusion is the same as the rational for including the requirement in the interim status standards.

VIII. Ignitable, Reactive, and Incompatible Wastes

A. Summary of Interim Status Requirements - §§265.198 and 265.199

The interim status requirement for ignitable or reactive waste stipulated that either the waste be mixed or treated in compliance with §265.17(b) so that it was no longer ignitable or reactive or that it be protected from any material or condition which could cause it to ignite or react. (A variance was provided for emergency storage tanks). The requirement also stipulated that NFPA buffer zone requirements for tanks be observed.

The interim status requirement for incompatible wastes stipulated that incompatible wastes not be placed in the same tank or in a tank which previously held an uncompatible waste unless §264.17(b) was complied with.

The §265.198 requirements for ignitable and reactive wastes were promulgated interim final; however, no comments were received.

B. Rationale for the Interim Status Standards

The rationale for the §265.198 and 265.199 requirements for ignitable reactive and incompatible wastes is contained in Sections XI and X of Chapter 3 (pp. 66-78).

C. Inclusion in General Standards

Requirements identical to the §§265.198 and 265.199 requirements have been included in the general standards for tanks. The rationale is the same as for inclusion in the interim status standards.

Comments have been added to §§264.198 and 264.199 referencing applicable requirements for waste analysis (§264.13), management of ignitable, reactive or incompatible wastes (§264.17), and recordkeeping (§264.73).

D. Final Language

§264.198 Special requirements for ignitable or reactive wastes

(a) Ignitable or reactive waste must not be placed in a tank unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the tank so that (i) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under §§261.21 or 261.23 of this Chapter, and (ii) §264.17(b) is complied with; or

(2) The waste is stored or treated in such a way that it is protected from any material or conditions which may cause the waste to ignite or react; or

(3) The tank is used solely for emergencies.

(b) The owner or operator of a facility which treats or stores ignitable or reactive waste in covered tanks must comply with the National Fire Protection Association's (NFPA's) buffer zone requirement for tanks, contained in Tables 2-1 through 2-6 of the "Flammable and Combustible Code - 1977".

[Comment: As required by §264.13, the waste anlysis plan must include analyses needed to comply with §264.198. Section 264.17(a) contains additional requirements for ignitable and reactive wastes.

Also, §264.17(c) requires waste analysis, trial tests or documentation to ensure compliance with §264.17(b). As required by §264.173, the owner or operator must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

§264.199 Special requirements for incompatible wastes

(a) Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank, unless §264.17(b) is complied with.

(b) Hazardous waste must not be placed in an unwashed tank which previously held an incompatible waste or material, unless §264.17(b) is complied with.

[Comment: As required by §264.13, the waste analysis plan must include analyses needed to comply with §264.199. Also, §264.17(c) requires waste analyses, trial tests, or documentation to ensure compliance with §264.17(b). As required by §264.73, the owner or operator must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

Chapter 5

Final Language

A. Interim Status Standards for Tanks

B. Interim Status Standards for Chemical, Physical and Biological Treatment

C. General Standards for Tanks

Interim Status Regulation Promulgated on May 19, 1980

Subpart J - Tanks

§265.190 Applicability

The regulations in this Subpart apply to owners and operators of facilities that use tanks to treat or store hazardous waste, except as §265.1 provides otherwsie.

[§265.191 Reserved]

§265.192 General Operating Requirements

(a) Treatment or storage of hazardous waste in tanks must comply with §265.17(b).

(b) Hazardous waste or treatment reagents must not be placed in a tank if they could cause the tank or its inner liner to rupture, leak, corrode or otherwise fail before the end of its intended life.

(c) Uncovered tanks must be operated to ensure at least 60 centimeters (2 feet) of freeboard, unless the tank is equipped with a containment structure (e.g., dike or trench), a trainage control system, or a diversion structure (e.g., standby tank) with a capacity that equals or exceeds the volume of the top 6 centimeters (2 feet) of the tank.

(d) Where hazardous waste is continuously fed into a tank, the tank must be equipped with a means to stop this inflow (e.g., a waste feed cutoff system or by-pass system to a stand-by tank).

[Comment: These systems are intended to be used in the event of a leak or overflow from the tank due to a system failure (e.g., a malfunction in the treatment process, a crack in the tank, etc.).]

§265.193 Waste Analysis and Trial Tests

(e) In addition to the waste anlysis required by §265.13, whenever a tank is to be used to:

(1) Chemically treat or store a hazardous waste which is substantially different from waste previously treated or stored in that tank; or

(2) Chemically treat hazardous waste with a substantially different process than any previously used in that tank;

the owner or operator must, before treating or storing the different waste or using the different process:

(1) Conduct waste analyses and trial treatment or storage tests (e.g., bench scale or pilot plant scale tests); or

(2) Obtain written, documented information on similar storage or treatment of similar waste under similar operating conditions;

to show that this proposed treatment or storage will meet all applicable requirements of §265.192(a) and (b).

[Comment: As required by §265.13, the waste anlysis plan must include analyses needed to comply with §§265.198 and 265.199. As required by §265.73, the owner or operator must place the results from each waste anlysis and trial test, or the documented information, in the operating record of the facility].

§265.194 Inspections

The owner or operator of a tank must inspect, where present:

(1) Discharge control equipment (e.g., waste feed cut-off systems, by-pass systems, and drainage systems), at least once each operating day, to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges), at least once each operating day, to ensure that the tank is being operated according to its design;

(3) The level of waste in the tank, at least once each operating day, to ensure compliance with §265.192(c);

(4) The construction materials of the tank, at least weekly, to detect corrosion or leaking of fixtures or seams; and

(5) The construction materials of, and the area immediately surrounding, discharge confinement structures (e.g., dikes), at least weekly, to detect erosion or obvious signs of leakage (e.g., wet spots or dead vegetation).

[Comment: As required by §265.15(c), the owner or operator must remedy any deterioration or malfunction he finds.]

[§§265.195 - 265.196 Reserved]

§265.197 Closure

At closure, all hazardous waste and hazardous waste residues must be removed from tanks, discharge control equipment, and discharge confinement structures.

[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate, in accordance with §261.3(c) or (d) of this Chapter, that any solid waste removed from his tank is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this Chapter.]

§265.198 Special requirements for ignitable or reactive waste

(a) Ignitable or reactive waste must not be placed in a tank, unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the tank so that (i) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under §§261.21 or 261.23 of this Chapter, and (ii) §265.17(b) is complied with; or

(2) The waste is stored or treated in such a way that it is protected from any material or conditions which may cause the waste to ignite or react; or

(3) The tank is used solely for emergencies.

(b) The owner or operator of a facility which treats or stores ignitable or reactive waste in covered tanks must comply with the National Fire Protection Association's (NFPA's) buffer zone requirements for tanks, contained in Tables 2-1 through 2-6 of the "Flammable and Combustible Code - 1977".

[Comment: See §265.17(a) for additional requirements.]

§265.199 Special requirements for incompatible wastes

(a) Incompatible wastes, or incompatible wastes and materials, (see Appendix V for examples) must not be placed in the same tank, unless §265.17(b) is complied with.

(b) Hazardous waste must not be placed in an unwashed tank which previously held an incompatible waste or material, unless §265.17(b) is complied with.

[§§265.200 - 265.219 Reserved.]

INTERIM STATUS STANDARD PROMULGATED ON MAY 19, 1980

Subpart Q - Chemical, Physical, and Biological Treatment

§265.400 Applicability

The regulations in this Subpart apply to owners and operators of facilities which treat hazardous wastes by chemical, physical, or biological methods in other than tanks, surface impoundments, and land treatment facilities, except as §265.1 provides otherwise. Chemical, physical, and bioloical treatment of hazardous waste in tanks, surface impoundments, and land treatment facilities must be conducted in accordance with Subparts J, K, and M, respectively.

§265.401 General operating requirements

(a) Chemical, physical, or biological treatment of hazardous waste must comply with §265.17(b).

(b) Hazardous wastes or treatment reagents must not be placed in the treatment process or equipment if they could cause the treatment process or equipment to rupture, leak, corrode, or otherwise fail before the end of its intended life.

(c) Where hazardous waste is continuously fed into a treatment process or equipment, the process or equipment must be equipped with a means to stop this inflow (e.g., a waste feed cut-off system or by-pass system to a standby containment device).

[Comment: These systems are intended to be used in the event of a malfunction in the treatment process or equipment.]

§265.402 Waste analysis and trial tests

In addition to the waste anlysis required by §265.13, whenever:

(1) A hazardous waste which is substantially different from waste previously treated in a treatment process or equipment at the facility is to be treated in that process or equipment, or

(2) A substantially different process than any previously used at the facility is to be used to chemically treat hazardous waste;

the owner or operator must, before treating the different waste or using the different process or equipment:

(1) Conduct waste analyses and trial treatment tests (e.g., bench scale or pilot plant scale tests); or

(2) Obtain written, documented information on similar treatment of similar waste under similar operating conditions;

to show that this proposed treatment will meet all applicable requirements of §265.401 (a) and (b).

[Comment: As required by §265.13, the waste analysis plan must include analyses needed to comply with §§265.405 and 265.406. As required by §265.73, the owner or operator must place the results from each waste anlysis and trial test, or the documented information, in the operating record of the facility.]

§265.403 Inspections

The owner or operator of a treatment facility must inspect, where present:

(1) Discharge control and safety equipment (e.g., waste feed cut-off systems, by-pass systems, drainage systems, and pressure relief systems) at least once each operating

day, to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges), at least once each operating day, to ensure that the treatment process or equipment is being operated according to its design;

(3) The construction materials of the treatment process or equipment, at least weekly, to detect corrosion or leaking of fixtures or seams; and

(4) The construction materials of, and the area immediately surrounding, discharge confinement structures (e.g., dikes), at least weekly, to detect erosion or obvious signs of leakage (e.g., wet spots or dead vegetation).

[Comment: As required by §265.15(c), the owner or operator must remedy any deterioration or malfunction he finds.]

§265.404 Closure

At closure, all hazardous waste and hazardous waste residues must be removed from treatment processes or equipment, discharge control equipment, and discharge confinement structures.

[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate, in accordance with §261.3(c) and (d) of this Chapter, that any solid waste removed from his treatment process or equipment is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this Chapter.]

§265.405 Special requirements for ignitable or reactive waste

(a) Ignitable or reactive waste must not be placed in a treatment process or equipment unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the treatment process or equipment so that (i) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under §§261.21 or 261.23 of this chapter, and (ii) §265.17(b) is complied with; or

(2) The waste is treated in such a way that it is protected from any material or conditions which may cause the waste to ignite or react.

§265.406 Special requirements for incompatible wastes

(a) Incompatible wastes, or incompatible wastes and materials, (see Appendix V for examples) must not be placed in the same treatment process or equipment, unless §265.17(b) is complied with.

(b) Hazardous waste must not be placed in unwashed treatment equipment which previously held an incompatible waste or material, unless §265.17(b) is complied with.

[§§265.407 - 265.429 Reserved.]

GENERAL STANDARDS PROMULGATED JANUARY 1981

SUBPART J - TANKS

§264.190 Applicability.

(a) The regulations in this Subpart apply to owners and operators of facilities that use tanks to treat or store hazardous waste, except as §264.1 and paragraph (b) of this Section provide otherwise;

(b) The regulations in this Subpart do not apply to facilities that treat or store hazardous waste in covered underground tanks that cannot be entered for inspection.

§264.191 Design of tanks.

(a) Tanks must have sufficient shell strength and, for closed tanks, pressure controls (e.g., vents) to assure that they do not collapse or rupture. The Regional Administrator will review the design of the tanks, including the foundation, structural support, seams and pressure controls. The Regional Administrator shall require that a minimum shell thickness be maintained at all times to ensure sufficient shell strength. Factors to be considered in establishing minimum thickness include the width, height, and materials of construction of the tank, and the specific gravity of the waste which will be placed in the tank. In reviewing the design of the tank and establishing a minimum thickness, the Regional Administrator shall rely upon appropriate industrial design standards and other available information.

[Comment: Design standards for certain types of tanks are published by the American Petroleum Institute, Underwriter's Laboratories, the American Concrete Institute, and several other organizations.]

§264.192 General operating requirements.

(a) Wastes and other materials (e.g., treatment reagents) which are incompatible with the material of construction of the tank must not be placed in the tank unless the tank is protected from accelerated corrosion, erosion or abrasion through the use of:

(1) An inner liner or coating which is compatible with the waste or material and which is free of leaks, cracks, holes or other deterioration; or

(2) Alternative means of protection (e.g., cathodic protection or corrosion inhibitors).

(b) The owner or operator must use appropriate controls and practices to prevent overfilling. These must include:

(1) Controls to prevent overfilling (e.g., waste feed cutoff system or by-pass system to a standby tank); and

(2) For uncovered tanks, maintenance of sufficient freeboard to prevent overtopping by wave or wind action or by precipitation.

§264.193 [Reserved]

§264.194 Inspections.

(a) The owner or operator must inspect:

(1) Overfilling control equipment (e.g., waste feed cutoff systems and by-pass systems) at least once each operating day to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges) where present, at least once

each operating day to ensure that the tank is being operated according to its design;

(3) For uncovered tanks, the level of waste in the tank, at least once each operating day, to ensure compliance with §264.192(b)(2);

(4) The construction materials of the above-ground portions of the tank, at least weekly to detect corrosion or erosion and leaking of fixtures and seams; and

(5) The area immediately surrounding the tank, at least weekly, to detect obvious signs of leakage (e.g., wet spots or dead vegetation).

(b) As part of the inspection schedule required in §264.15(b) and in addition to the specific requirements of paragraph (a) of this Section, the owner or operator must develop a schedule and procedure for assessing the condition of the tank. The schedule and procedure must be adequate to detect cracks, leaks, corrosion or erosion which may lead to cracks or leaks, or wall thinning to less than the thickness required under §264.191. Procedures for emptying a tank to allow entry and inspection of the interior must be established when necessary to detect corrosion or erosion of the tank sides and bottom. The frequency of these assessments must be based on the material of construction of the tank, type of corrosion or erosion protection used, rate of corrosion or erosion observed during previous inspections, and the characteristics of the waste being treated or stored.

(c) As part of the contingency plan required under Subpart D of Part 264, the owner or operator must specify the procedures he intends to use to respond to tank spills or leakage, including procedures and timing for expeditious removal of leaked or spilled waste and repair of the tank.

[Comment: As required in §264.15(c), the owner or operator must remedy any leak, crack, or wall thinning in violation of §264.191, or equipment or process malfunction in violation of §264.192, which he discovers during inspection. See 29 CFR §1910.94 (d)(11) for Occupational Safety and Health Administration requirements relating to entry of tanks for inspection.]

§§264.195 - 264.196 [Reserved]

§264.197 Closure.

At closure, all hazardous waste and hazardous waste residues must be removed from tanks, discharge control equipment, and discharge confinement structures.

[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with §261.3(d) of this Chapter that the solid waste removed from his tank is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262 - 266 of this Chapter.]

§264.198 Special requirements for ignitable or reactive wastes.

(a) Ignitable or reactive waste must not be placed in a tank unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the tank so that (i) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under §§261.21 or 261.23 of this Chapter, and (ii) §264.17(b) is complied with; or

(2) The waste is stored or treated in such a way that it is protected from any material or conditions which may cause the waste to ignite or react; or

(3) The tank is used solely for emergencies.

(b) The owner or operator of a facility which treats or stores ignitable or reactive waste in covered tanks must comply with the National Fire Protection Association's (NFPA's) buffer zone requirements for tanks, contained in Tables 2-1 through 2-6 of the "Flammable and Combustible Code - 1977".

[Comment: As required by §264.13, the waste analysis plan must include analyses needed to comply with §264.198. Section 264.17(a) contains additional requirements for ignitable and reactive wastes. Also, §264.17(c) requires waste analysis, trial tests, or other documentation to ensure compliance with §264.17(b). As required by §264.73, the owner or operator must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

§264.199 Special requirements for incompatible wastes.

(a) Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank, unless §264.17(b) is complied with.

(b) Hazardous waste must not be placed in an unwashed tank which previously held an incompatible waste or material, unless §264.17(b) is complied with.

[Comment: As required by §264.13, the waste analysis plan must include analyses needed to comply with §264.199. Also, §264.17(c) requires waste analyses, trial tests, or other documentation to ensure compliance with §264.17(b). As required by §264.73, the owner or operator must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

§§264.200 - 264.219 [Reserved]

CHAPTER 6

PROPOSAL: Inspection Requirement for Owners and Operators of Hazardous Waste Storage and Treatment Tanks

The Interim Status Standards for hazardous waste treatment and storage tanks contain requirements for weekly inspections of monitoring equipment, discharge control and safety equipment, and the construction materials of the tank and discharge confinement structures surrounding the tank (40 CFR, Part 265, §265.194).

EPA is proposing to amend §265.194 by adding a paragraph (b) requiring that owners and operators periodically conduct a comprehensive inspection to ensure that any corrosion, leaks or weak spots not detectable through routine visual inspection of the exterior of the tank will be discovered. In most cases tanks must be emptied and the interior o the tank inspected for cracks, weak spots and corrosion. The frequency of these inspections must be based on the material of construction of the tank, type of corrosion protection used, and the characteristics of the waste being stored or treated since these factors determine the rate of possible deterioration.

A. Rationale for the Paragraph (b) Requirement

While no method for assessing the condition of a tank can accurately determine whether it will or will not fail, several factors can be used to estimate the general extent and rate of actual deterioration. These factors are:

(1) thickness and strength of material at likely weak spots, whether corrosion has caused substantial decrease in the thickness of the structural material,

(2) extent of corrosion as determined through inspecting both the inner and outer surfaces of the tank, and

(3) extent to which minor failures have occurred which indicates general deterioration of the tank.

Damage cases 9 and 11 in the "Introduction and Rationale" section of this document are examples of situations where deteriorated tanks contributed to the contamination of surface and ground waters.

While inspections of the exterior of the tank can be performed routinely (weekly), interior inspections would usually be performed when the tank is temporarily out of service as this eliminates the time and cost involved in emptying the tank. The frequency of these interior inspections would be based on the rate of possible deterioration of the tank as determined through consideration of the material of construction of the tank, type of corrosion protection used, and the characteristics of the waste being stored.

While the procedures to be used in the inspection will be specified by the owner or operator in the inspection schedule, some useful components of such an inspection are specified below.

(1) empty the tank;

(2) vent remaining vapors;

(3) test quality of air - add a non-reactive atmosphere or use life support systems, if necessary;

(4) visually inspect the interior of the tank;

(5) test walls and bottom through hammering or use of an ultrasonic device.

EPA believes that in the large majority of cases entry into the tank is necessary to conduct a through inspection. However, viewing or testing the tank through an access door or porthole would usually be acceptable fo small tanks (i.e. less than 1,000 gallons). The owner or operator may use procedures for inspection of larger tanks which do not require entry. However, these procedures must be adequate to detect cracks, leaks, or corrosion which may lead to cracks or leaks.

B. Final Language

(b) As part of the inspection schedule required in §265.15(b) and in addition to the specific requirements of paragraph (a) of this Section, the owner or operator must develop a schedule and procedure for assessing the condition of the tank. The and procedure must be adequate to detect cracks, leaks, or corrosion which may lead to cracks or leaks. Procedures for emptying a tank to allow entry and inspection of the interior must be established when necessary to detect corrosion of the tank sides and bottom. The frequency of these assessments must be based on the material of construction of the tank, type of corrosion protection used, and the characteristics of the waste being treated or stored.

CHAPTER 7

PROPOSAL: Air Emissions Requirement for Hazardous Waste Storage and Treatment Tanks

A requirement for the control of air emissions from tank facilities (§264.200) is being proposed for inclusion in the General Standards for tanks (40 CFR, Part 264, Subpart J).

A. Regulatory Precedent

On December 18, 1978 the Agency proposed several requirements pertaining to the control of air emissions from tanks. The proposed requirements stipulated that all storage tanks were to be covered. The proposed §250.44-1(a) stated that storage tanks which contain volatile waste could not be vented directly to the atmosphere. The proposed §250.42-3 requirement stated that all facilities must be designed and operated in such a manner as to prevent air emission in violation of regulations promulgated pursuant to Sections 110, 111, and 112 of the Clean Air Act (CAA). The proposed §250.44(f) requirement added that if the Regional Administrator determined that open storage of a waste could result in a violation of the Clean Air Act regulations, the waste must be stored in a closed tank.

Commenters stated that the requirements should be based more directly on the quantity and concentration of harmful vapors emitted, or alternatively that the requirements should be deleted and authority deferred to the Clean Air Act. The Agency has stated in the preamble to the May 19, 1980 regulation (45 FR 33172 - 33173) that RCRA authority is a more efficient vehicle for controlling air emissions from hazardous waste facilities than is the Clean Air Act. EPA agrees with commenters, however, that the regulation of such emissions should be based on the quantity and concentrations of harmful vapors and their impact on human health and the environment. Regulations under the Clean Air Act to address in part the problem of air emissions from tanks may be promulgated in the near future. EPA has developed and distributed to the public, preproposal drafts of "Standards of Performance for New Stationary Sourcs - Volatile Organic Liquid Storage Vessels." The requirement would be proposed under the authority of Section 111 of the Clean Air Act, and would include storage of volatile organics in tanks.

B. Integration with New Source Performance Standards for Storage of Volatile Organics

The draft regulation for volatile organic liquid storage vessels does not, by itself, adequately control air emissions from hazardous waste facilities. While the draft CAA regulation would apply to hazardous waste storage tanks containing over 15,000 gallons of volatile organic liquids, the regulation would not control potentially hazardous air emissions from hazardous waste treatment processes conducted in tanks. EPA is particularly concerned with cyanide destruction processes and with precipitation and chromium reduction processes involving the use of bisulfide. Process upsets, such as pH fluctuation, at facilities using these processes can result in emissions of toxic HCN or H_2S gases which can threaten not only workers but surrounding communities. Therefore, a RCRA regulation, which complements and is not inconsistent with existing and proposed CAA regulations, is necessary for the control of air emissions from hazardous waste facilities.

C. Environmental and Human Health Hazards

There are several paths of release of air emissions from hazardous waste facilities. The most obvious is the volatilization of liquids stored in open tanks. The draft regulations on volatile organic liquid storage would require that tanks containing volatile organics be covered and vapors contained with a floating roof. Similar standards are already in effect for petroleum storage. However, the draft regulations would only apply to new sources. Emissions from existing tanks used for volatile liquid storage would remain uncontrolled.

Treatment processes conducted in tanks also have the potential for hazardous air emissions. Process upsets in neutralization, chromium reduction or precipitation processes involving sulfides can result in the release of toxic H_2S gas. A system upset in a cyanide destruction process can result in the release of toxic HCN gas. Physical treatment processes involving steam stripping distallation or agitation can result in the discharge of toxic organic constituents to the air. The emissions from these treatment processes, are at present, largely uncontrolled.

D. Proposed Approach and Alternatives Considered

The proposed approach would require the owner or operator to evaluate the potential for hazardous air emissions at their facility and to establish adequate treatment process controls, emission controls, and safety or emergency procedures as are necessary to protect human health and the environment. Both the evaluation as to potential hazards from air emissions and the controls established to protect human health and the environment will be subject to review by the Regional Administrator during the permit process.

Several alternatives to the proposed requirement were considered by EPA. Each is discussed below:

(1) Defer to CAA authority. As discussed above the CAA regulations would not control emissions from treatment processes, treatment process upsets, or volatile emissions from existing tanks. The Agency is concerned with a large varicty of treatment processes including cyanide destruction, chromium reduction, precipitation, steam stripping, physical agitation and others. To regulate each of these potential sources through CAA authority would be extremely cumbersome.

(2) Process specific requirements. The Agency considered developing controls which would be specific to each type of treatment process (e.g. require automatic pH control systems at cyanide destruction facilities). However, in view of th large number of processes used for hazardous waste treatment and the large variation between facilities in technologies used for a given process, the Agency decided that process specific controls would be both inflexible and unwieldy.

E. Proposed Language

§264.200 Air Emissions

(a) All tanks must have such treatment process controls, emission controls, and safety or emergency procedures as are necessary to protect human health and the environment from toxic or otherwise harmful fumes, mists or gases resulting from:

(1) Volatilization of wastes stored or treated in the tank;

(2) Chemical reactions in the tank, either routine or resulting from process upsets; or

(3) Physical agitation or other forms of treatment conducted in the tank.

Reference

1. Trip Report. John Schaum and Gene Crumpler, Technology Program, Hazardous Waste Management Division - January 24, 1979. (A brief description of the damage incident was published in Solid Waste Management, "News Briefs", Decmber 8, 1977.)

2. Confirmed by telephone by Cindy Giansante, Environmental Scientist, EPA, Washington, D.C., on October 30, 1979, with Joseph A. Feola, Water Quality Specialist; Pennsylvania Department of Environmental Resources; Norristown, PA.

3. Confirmed by telephone by Cindy Giansante, Environmental Scientist, EPA, Washington, D.C., on October 30, 1979, with Kenneth Young, Chief of Operations; Pennsylvania Department of Environmental Resources; Meadville, Pennsylvania.

4. Letter from Jerry T. Thornhill, Chief Emergency Response Branch, EPA, Region VI to Arsen Darnay, Jr., Director Resource Recovery Division, EPA, Washington, D.C. October 27, 1972: "Hazardous Waste Study".

5. Jatayama, H.K., J.J. Chan, E.R. de Vera, R.D. Stephens, and D.L. Storm. "A Method for Determining Hazardous Wastes Compatibility." Grant No. R804692. Prepared for the Municipal Environmental Research Laboratory, Office of Research and Development, U.S. EPA, Cincinnati, Ohio, 1980.

6. Confirmed by telephone by Cindy Giansante, Environmental Scientist, EPA, Washington, D.C., on November 15, 1979, with Ron Kimbro, Texas Department of Water Resources, Austin, Texas.

7. U.S. Environmental Protection Agency. Oil and Special Materials Control Division. Damages and Threats Caused by Hazardous Material Sites, Draft Report, February 1980, pages 15-19.

8. Personal Communication between Mike Zicler and John Harsh of EPA, Region III and Karen Walker. November 12, 1980.

9. Personal Communication between Phil Retalic of EPA Region III and Karen Walker. November 19, 1980.

10. Personal Communication between Jack Downey of EPA, Region III West Virginia laboratory and Karen Walker. November 19, 1980.

11. EPA Hazardous Waste Enforcement Task Force, Civil Action #80-0771, Filed 3-5-80, U.S. District Court for the Eastern District of Louisiana.*

12. EPA Hazardous Waste Enforcement Task Force, Civil Action #80-3438, Filed 9-2-80, U.S. District Court for the Eastern District of Pennsylvania.*

13. EPA Hazardous Waste Enforcement Task Force, Civil Action #80-1589, Filed 4-23-80, U.S. District Court for the Eastern District of Pennsylvania.*

14. Texas Department of Water Resources, Industrial Solid Waste Management. Technical Guideline #9, "Noncompatible Wastes". Revised March 1, 1978.

15. State of Louisiana Department of Natural Resources, Rules and Regulations, Hazardous Waste management Plan, Mandated by: Act 334 of 1978: Section 8.4.9. Chemical, Physical, and Biological Treatment Facilities.

16. Tennessee Department of Public Health, Division of Solid Waste Management, Draft Hazardous Waste Management Regulations, Rule 8, Requirements Pertaining to Hazardous Waste Storage Facilitis. August, 1978.

17. Op. cit. Texas Guideline #4, "Ponds and Lagoons".

18. Op. cit. Texas Guideline #9, "Noncompatible Wastes".

19. South Carolina Department of Health and Environmental Control, Draft Hazardous Waste Management Regulations. R.61-74.4, Standards for Treatment, Storage, and Disposal Facilities.

20. Minnesota Code of Agency Rules. Pollution Control Agency (PCA) - Hazardous Waste. 6 MCAR §4.9004, "Location, operation and closure of a hazardous waste facility: C. Hazardous Facility Operation, 3. Storage of hazardous waste in containers and tanks.

21. Op. cit. State of Louisiana Rules and Regulations, Section 8.4.3 Impoundments and basins.

22. Op. cit. Texas Guideline #4, "Ponds and Lagoons".

23. Op. cit. State of Louisiana Rules and Regulations, Section 8.4.9 Chemical, Physical and Biological Treatment Facilities.

*Summaries of these cases are available from EPA Hazardous Waste Enforcement Task Force.

24. Op. cit. Texas Guideline #4, "Ponds and Lagoons".

25. Op. cit. State of Louisiana Ruls and Regulations, Section 8.4.9 Chemical, Physical and Biological Treatment Facilities.

26. Op. cit. State of Louisiana Rules and Regulations Section 8.4A Hazardous Waste Storage Tanks.

27. Wyoming Solid Waste Rules, Section^{11}. Industrial and Hazardous Waste Facility Construction and Operation Approval. Wyoming Department of Environmental Quality Solid Waste Management Rules and Regulations, December 22, 1975.

~~28. New York Regulations for the Bulk Storage of Hazardous Materials, Subchapter C, Part 380. Statuatory Authority: Environmental Conservation Law 3-0301 (m) and Chapter 997 of Laws of 1972.~~

29. Iowa Solid Waste Disposal Rules, Sanitary Disposal Projects with Processing Facilities, August 31, 1978.

30. Middlebrook, E. Joe et al. Upgrading Wastewater Stabilization Ponds to Meet New Discharge Standards. Symposium Proceedings sponsored by Utah Water Research Laboratory, Utah State University and U.S. Environmental Protection Agency, ORD, November, 1974.

31. U.S. Environmental Protection Agency. Process Design Manual for Upgrading Existing Wastewater Treatment Plants U.S. EPA Technology Transfer, October, 1974, pg. 3-14.

32. Liptak, Bela G., ed. Environmental Engineers' Handbook, Volume 1, Water Pollution, pg. 815.

33. National Fire Protection Association, NFPA 30 Flammable and Combustible Code 1977, pg. 3.

34. National Association of Corrosion Engineers, Direct Calculation of Economic Appraisals of Corrosion Control Measures. Houston, Texas, 1972.

35. American Concrete Institute (ACI), ACI Committee 350. Concrete Sanitary Engineering Structures. ACI-350R-77. Detroit, Michiga, 1977. pp. 16-17.

36. American Petroleum Institute (API), Standard 650; Welded Steel Tanks for Oil Storage. 6th ed. Revision 3. Washington, D.C. 1979.

37. API Standard 620. Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks. 5th ed. Washington, D.C. 1973.

38. The American Water Works Association (A.W.W.A.) D100-79, Standard for Steel Tanks - Standpipes, Reservoirs, and Elevated Tanks for Water Storage. Denver, Colorado, 1979.

39. American Society of Mechanical Engineers (A.S.M.E.) Boiler and Pressure Vessel Code Section VIII. New York, 1974.

40. Underwriters Laboratories UL142. Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids. 4th ed. Northbrook, Illinois, 1972.

41. American Concrete Institute (ACI), ACI Committee 350. Concrete Sanitary Engineering Structures, ACI - 350R-77. Detroit, Michigan, 1977.

42. Permit Writers Guidance Manual on Tanks. Prepared by EPA Office of Solid Waste, Fred C. Hart Associates, Inc., 1980. Chapter 3 - Tank Design and Selection Considerations.

43. Guidance Manual on Compatibility. Prepared for EPA Office of Solid Waste, Fred C. Hart Associates, Inc. 1980.

44. Op. cit. Permit Writers' Guidance Manual on Tanks. Chapter 5 - Inspection Evaluation.

APPENDIX [illegible] — 1

NFPA Buffer Zone Requirements for Tanks

Table 2-1

Stable Liquids (Operating Pressure 2.5 psig or Less)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which Is or Can Be Built Upon, Including the Opposite Side of a Public Way and Shall Be Not Less Than 5 Feet	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property and Shall Be Not Less Than 5 Feet
Floating Roof [See 2-2.1.1(a)]	Protection for Exposures*	½ times diameter of tank	⅙ times diameter of tank
	None	Diameter of tank but need not exceed 175 feet	⅙ times diameter of tank
Vertical with Weak Roof to Shell Seam (See 2-2.1.1)	Approved foam or inerting system on tanks not exceeding 150 feet in diameter**	½ times diameter of tank	⅙ times diameter of tank
	Protection for Exposures*	Diameter of tank	⅓ times diameter of tank
	None	2 times diameter of tank but need not exceed 350 feet	⅓ times diameter of tank
Horizontal and Vertical with Emergency Relief Venting To Limit Pressures to 2.5 psig	Approved inerting system on the tank or approved foam system on vertical tanks	½ times Table 2-6	½ times Table 2-6
	Protection for Exposures*	Table 2-6	Table 2-6
	None	2 times Table 2-6	Table 2-6

*See definition for "Protection for Exposures."

**For tanks over 150 ft. in diameter use "Protection for Exposures" or "None" as applicable.

Table 2-2

Stable Liquids (Operating Pressure Greater Than 2.5 psig)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which Is or Can Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property
Any Type	Protection for Exposures*	1½ times Table 2-6 but shall not be less than 25 feet	1½ times Table 2-6 but shall not be less than 25 feet
	None	3 times Table 2-6 but shall not be less than 50 feet	1½ times Table 2-6 but shall not be less than 25 feet

*See Definition for "Protection for Exposures."

Table 2-3

Boil-over Liquids

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which Is or Can Be Built Upon, Including the Opposite Side of a Public Way and Shall Be Not Less Than 5 Feet	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property and Shall Be Not Less Than 5 Feet
Floating Roof [See 2-2.1.1(a)]	Protection for Exposures*	½ times diameter of tank	⅙ times diameter of tank
	None	Diameter of tank	⅙ times diameter of tank
Fixed Roof [See 2-2.1.4(a)]	Approved foam or inerting system	Diameter of tank	⅓ times diameter of tank
	Protection for Exposures*	2 times diameter of tank	⅔ times diameter of tank
	None	4 times diameter of tank but need not exceed 350 feet	⅔ times diameter of tank

*See definition for "Protection for Exposures."

142

Table 2-4 Unstable Liquids

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which Is or Can Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property
Horizontal and Vertical Tanks with Emergency Relief Venting to Permit Pressure Not in Excess of 2.5 psig	Tank protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	Table 2-6 but not less than 25 feet	Not less than 25 feet
	Protection for Exposures*	2½ times Table 2-6 but not less than 50 feet	Not less than 50 feet
	None	5 times Table 2-6 but not less than 100 feet	Not less than 100 feet
Horizontal and Vertical Tanks with Emergency Relief Venting to Permit Pressure Over 2.5 psig	Tank protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	2 times Table 2-6 but not less than 50 feet	Not less than 50 feet
	Protection for Exposures*	4 times Table 2-6 but not less than 100 feet	Not less than 100 feet
	None	8 times Table 2-6 but not less than 150 feet	Not less than 150 feet

*See definition for "Protection for Exposures."

Table 2-5 Class IIIB Liquids

Capacity Gallons	Minimum Distance in Feet from Property Line Which Is or Can Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property
12,000 or less	5	5
12,001 to 30,000	10	5
30,001 to 50,000	10	10
50,001 to 100,000	15	10
100,001 or more	15	15

Table 2-6

Reference Table for Use in Tables 2-1 to 2-4

Capacity Tank Gallons	Minimum Distance in Feet from Property Line Which Is or Can Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

143

pd1941.7